

# Announcing

## A PORTFOLIO OF FISH

By MILES E. ROST, Artist and Author

For the first time eighty different pictures of Fish in natural life-colors, are offered to educators, museums, libraries and fish enthusiasts, in portfolio form. Each fish measures twelve to fifteen inches in length and is printed on very heavy, high-grade enameled paper, 13x20 inches, suitable for framing if desired. This entire collection of eighty different pictures of Fish in natural life-colors, has been reproduced in the original colors; and is now offered for sale by subscription only, in two loose-leaf portfolio-volumes, at the unprecedentedly low price of \$25.00 per volume. Each portfolio-volume contains one black and white chart, and forty different colored pictures, in style and quality exactly similar to the samples herewith. The portfolio container for each volume is durable, neat and attractive.

The distinctive technic of the originals from which these colored plates were made permits the depiction of minute details. The loose-leaf portfolio-volume is notably convenient for use in educational institutions, libraries, museums, clubs and other places where Fish are discussed. Complete informative text for each plate supplies authentic data as to native habitat, average size, where introduced and other interesting facts.

This unprecedented offer is contingent on the number of subscriptions received for this highly artistic, scientifically accurate presentation of the subject of Fish. Invaluable to teachers, biologists, and ichthyologists. Read attached copies of commendatory letters from such leading scientists and authorities as Doctor H. U. Sverdrup, Director, The Scripps Institution of Oceanography, (University of California) at La Jolla, California; and Doctor E. C. Moore, President, California State Fish and Game Commission.

Delivery of portfolio-volumes will begin as soon as sufficient subscriptions are received.

Address all communications to

MILES E. ROST

1114 West St.  
Delmonico-Lobby.

1228-1230 So. Flower St.  
LOS ANGELES, CALIF.

Care Carl A. Bundy  
Quill & Press

[PLEASE USE THE ORDER BLANK ON PAGE 3]

## NAMES OF EIGHTY-TWO FISH PICTURED IN PORTFOLIO

### VOLUME I.

1. *Salmo salar* (*Linnaeus*) Atlantic Salmon
2. *Salmo sebago* (*Girard*) Land-locked Salmon (Breeding male)
3. *Salmo sebago* (*Girard*) Land-locked Salmon (Breeding female)
4. *Salmo trutta* (*Couch*) Sea Trout
5. *Salmo fario* (*Couch*) European Brown Trout
6. *Salmo ceacifer* (*Yarrell*) Loch-leven Trout
7. *Salmo confinis* (*De Kay*) Lake Trout (Doughty)
8. *Salmo clarkii* (*Richardson*) Coast Cutthroat Trout
9. *Salmo clarkii* (*Richardson*) Alaska Cutthroat Trout
10. *Salmo henshawi* (*Gill and Jordan*) Lake Tahoe Trout
11. *Salmo tahoensis* (*Jordan and Evermann*) Silver Trout of Lake Tahoe
12. *Salmo gairdneri* (*Richardson*) Steelhead Trout
13. *Salmo irideus* (*Gibbons*) Alaska Rainbow Trout
14. *Salmo irideus* (*Gibbons*) Coast Rainbow Trout
15. *Salmo irideus* *stonei* (*Jordan*) Stone's Trout
16. *Salmo irideus* *gilberti* (*Jordan*) Kern River Trout
17. *Salmo whitei* (*Evermann*) Soda Creek Golden Trout
18. *Salmo agua bonita* (*Jordan*) South Fork Golden Trout
19. *Salmo Roosevelti* (*Evermann*) Volcano Creek Golden Trout
20. *Salvelinus alpinus* (*Cuvier*) Willughby's Char
21. *Salvelinus oquassa* (*Girard*) Blueback Trout
22. *Salvelinus aureolus* (*Bean*) White Trout (Breeding male)
23. *Salvelinus aureolus* (*Bean*) White Trout (Breeding female)
24. *Salvelinus fontinalis* (*Mitchill*) Eastern Brook Trout
25. *Salvelinus fontinalis* (*Mitchill*) (Maine variety) Eastern Brook Trout (Breeding female)
26. *Salvelinus fontinalis* (*Mitchill*) (Maine variety) Eastern Brook Trout (Breeding male)
27. *Salvelinus fontinalis* (*Mitchill*) (New York variety) New York Brook Trout
28. *Salvelinus erythrogaster* (*De Kay*) Red-bellied Trout

### 29. *Salvelinus malma* (*Walbaum*) Dolly Varden Trout

30. *Cristivomer namaycush* (*Richardson*) Great Lakes Trout

Mackinaw Trout

### 31. Chart

32. *Oncorhynchus tschawytscha* (*Steller*) (*Walbaum*) Chinook Salmon (Adult male)

33. *Oncorhynchus tschawytscha* (*Steller*) (*Walbaum*) Chinook Salmon (Female)

34. *Oncorhynchus nerka* (*Steller*) (*Walbaum*) Blueback Salmon (Adult male)

35. *Oncorhynchus nerka* (*Steller*) (*Walbaum*) Blueback Salmon (Adult female)

36. *Oncorhynchus nerka* (*Steller*) (*Walbaum*) Red Salmon (Breeding male)

37. *Oncorhynchus nerka* (*Steller*) (*Walbaum*) Red Salmon (Breeding female)

38. *Oncorhynchus kisutch* (*Steller*) (*Walbaum*) Silver Salmon or Coho (Breeding male)

39. *Oncorhynchus kisutch* (*Steller*) (*Walbaum*) Silver Salmon or Coho (Breeding female)

40. *Oncorhynchus keta* (*Steller*) (*Walbaum*) Dog Salmon (Breeding male)

41. *Oncorhynchus keta* (*Steller*) (*Walbaum*) Dog Salmon (Breeding female)

### VOLUME II.

42. *Oncorhynchus gorbuscha* (*Steller*) (*Walbaum*) Humpback Salmon (Breeding male)

43. *Oncorhynchus gorbuscha* (*Steller*) (*Walbaum*) Humpback Salmon (Breeding female)

44. *Coregonus albus* (*Lesueur*) Lake Erie Whitefish

45. *Coregonus quadrilateralis* (*Richardson*) Menominee Whitefish

46. *Huso nigricans* (*Cuvier and Valenciennes*) Black Huron

47. *Haemulon salmoides* (*De Kay*) The Growler

48. *Haplodinotus grunniens* (*Rafinesque*) Fresh-water Drum or Gaspergou

49. *Acipenser sturio* (*Linnaeus*) Common Sturgeon

50. *Amiurus nebulosus* (*Lesueur*) Common Catfish

51. *Lota maculosa* (*Lesueur*) Spotted Burbot

52. *Alosa sapidissima* (*Cuvier*) (*Storer*) Common Shad—American Shad

53. *Catostomus communis* (*Lesueur*) Common Sucker

54. *Lepomis pallidus* (*Mitchill*) Blue Sunfish

55. *Cyprinus carpio* (*Lacepede*) Common Carp

### 56. Chart

57. *Micropterus salmoides* (*Lacepede*) Large-mouthed Black-Bass

58. *Micropterus dolomieu* (*Lacepede*) Small-mouthed Black-Bass

59. *Roccus chrysops* (*Rafinesque*) White-Bass

60. *Roccus lineatus* (*Bloch*) Striped Bass or Rockfish

61. *Amblilipterus rupestris* (*Rafinesque*) Rock Bass—Redeye—Goggle-eye

62. *Morone interrupta* (*Gill*) Yellow Bass

63. *Morone americana* (*Gmelin*) White Perch

64. *Pomoxys annularis* (*Rafinesque*) Crappie

65. *Pomoxys sparoides* (*Lacepede*) Calico Bass

66. *Chaenobryttus gulosus* (*Gill*) Warmouth

67. *Perca flavescens* (*Mitchill*) Yellow Perch—Ringed Perch

68. *Archoplites interruptus* (*Gill*) Sacramento Perch

69. *Stizostedion vitreum* (*Mitchill*) Wall-eyed Pike—Pike-Perch

70. *Stizostedion canadense* (*Smith*) Sauger—Sand-Pike

71. *Esox Lucius* (*Linnaeus*) Common Pike

72. *Esox americanus* (*Gmelin*) Banded Pickerel

73. *Esox nobilior* (*Thompson*) Maskinonge

74. *Esox reticulatus* (*Lesueur*) Common Eastern Pickerel

75. *Tylosurus longirostris* (*Mitchill*) Garfish

76. *Leucichthys sisco huronius* (*Jordan and Evermann*) Lake Huron Herring

77. *Leucichthys artedi* (*Lesueur*) Erie Herring

78. *Leucichthys nigripinnis* (*Gill*) Blackfin of Lake Michigan

79. *Thymallus signifer* (*Richardson*) Alaska Grayling—Arctic Grayling

80. *Thymallus montanus* (*Milner*) Montana Grayling

81. *Thymallus tricolor* (*Cope*) Michigan Grayling

82. *Trachinotus Carolinus* (*Linnaeus*) Common Pompano

*Sally*

UNIVERSITY OF CALIFORNIA

ROBERT G. SPROUL  
PRESIDENT OF THE UNIVERSITY

THE SCRIPPS INSTITUTION OF OCEANOGRAPHY  
LA JOLLA, CALIFORNIA

H. U. SVERDRUP  
DIRECTOR

*March 16, 1937*

*August, 1947* *M.W.*

To Whom It May Concern:

I have had opportunity to see a series of the colored pictures of fishes which Mr. Miles Rost has completed, and I am much impressed by his accuracy of observation and his ability to give a correct and natural-looking picture of fishes. Other members of the staff of the Scripps Institution are equally impressed by the excellent drawings.

I would consider it of great advantage if Mr. Rost's pictures of fishes could be reproduced in natural colors such that complete sets could be available at a reasonable price. Such sets ought to be used for demonstration at high schools and colleges or similar educational institutions and would, furthermore, be of great interest to a large group of sport fishermen. I hope sincerely that publication of these pictures will be made possible.

*H. U. Sverdrup*

RR

MILES E. ROST,  
Care Carl A. Bundy Quill & Press,  
1228-1230 South Flower Street,  
Los Angeles, California.

Please reserve for me ..... Portfolio-Volume No. One; and ..... Portfolio-Volume No. Two, each containing one black and white chart and forty colored pictures of Fish, by Miles E. Rost, a total of eighty-two different pictures of Fish, which I agree to purchase at price of \$25.00 (Twenty-five Dollars) for each portfolio-volume; or \$50.00 (Fifty Dollars) for the two portfolio-volumes. I hereby agree to pay for same, plus transportation charges, on delivery to me.

(California purchasers add seventy-five cents per portfolio-volume for state sales tax. Single Portfolios of Volume One or Two may be purchased alone if desired.)

Name.....

Address.....

DENVER PUBLIC SCHOOLS  
Denver, Colorado  
A. L. THRELKELD, Superintendent

East High School  
Colfax Avenue and Elizabeth Street  
Roscoe C. Hill, Principal

August 27, 1935

Mr. Miles E. Rost  
Los Angeles, California  
Dear Mr. Rost:

I have seen your pen and ink drawings of the various species of trout. These drawings are excellent in technique and show the true color patterns about as accurately as it is possible to do it. Fish fade so rapidly out of the water and are subject to so much change in color during life due to food, water, stream bed and spawning season that few people appreciate the real scientific import of your work.

I think your drawings would be a valuable exhibit for visual instruction in schools and museums.

Very truly yours,

(Signed) WILLIAM S. GREEN, JR.  
Biology Dept.

Fish and Game Commission  
DR. E. C. MOORE  
President

FRANK F. MERRIAM  
Governor

GEORGE D. NORDENHOLT  
Director

STATE OF CALIFORNIA  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF FISH AND GAME

July 12, 1935

To whom it may concern:

Mr. Miles E. Rost has a very marvelous collection of pen and ink drawings in color made by himself. These drawings are all reproductions of living specimens and descriptions of the California Trout. I think these would be of the greatest value for educational and conservation purposes.

I understand he has already placed a number of these in different schools and institutions of Southern California and I most heartily endorse them.

Very truly yours,

(Signed) E. C. MOORE  
President Fish and Game Commission

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OFFICE OF THE DIRECTOR  
WM. ALANSON BRYAN  
The Museum, Exposition Park  
Los Angeles, Calif.  
U.S.A. Cable address, "Lamuseo".

LOS ANGELES MUSEUM  
OF HISTORY, SCIENCE AND ART  
and the  
OTIS ART INSTITUTE  
August 18, 1936

Mr. Miles E. Rost  
Los Angeles, California  
Dear Mr. Rost:

I have had much pleasure in examining the set of forty drawings illustrating the marine and fresh water fishes of Southern California. I wish to compliment you, not only on their scientific accuracy, but the faithful reproduction of the colors in life.

I can assure you that we would be glad to have a set of your drawings for the Museum library and Extension Department, where we have repeated call for reliable illustrations of our fishes.

Yours very truly,

(Signed) WM. A. BRYAN  
Director

NAMES OF EIGHTY-TWO FISH DESCRIBED IN PORTFOLIO

→ 1. Salmo salar (Linnaeus) Atlantic Salmon

→ 2. Salmo sebago (Girard) Land-locked salmon (Breeding male)

→ 3. " " " " (Breeding female)

→ 4. Salmo trutta (Linnaeus) Sea trout

→ 5. Salmo fario (Linnaeus) European brown trout

→ 6. Salmo levenensis (Walper) Lechleven trout

→ 7. Salmo confinis (De Kay) Lake trout (Deoughty)

→ 8. Salmo clarkii (Richardson) Coast cutthroat trout

→ 9. Salmo clarkii (Richardson) <sup>Coast</sup> Alaska cutthroat trout

→ 10. Salmo henshawi (Gill and Jordan) <sup>Lahontan</sup> cutthroat Lake Tahoe trout

→ 11. Salmo regalis (Snyder) Silver trout of Lake Tahoe

→ 12. Salmo gairdneri (Richardson) <sup>Royal</sup> <sup>Coast</sup> rainbow trout (steelhead phase)

→ 13. Salmo irideus (Gibbons) <sup>Coast</sup> Alaska rainbow trout (rainbow phase)

→ 14. Salmo irideus (Gibbons) Coast rainbow trout

→ 15. Salmo gairdneri stonei (Jordan) Shasta Stone's trout

→ 16. Salmo irideus gilberti (Jordan) Kern River trout

→ 17. Salmo whitei (Evermann) Soda Creek golden trout

→ 18. Salmo aguabonita (Jordan) South Fork golden trout

→ 19. Salmo peosevelti (Evermann) Volcanic Creek golden trout

→ 20. Salvelinus alpinus (Cuvier) <sup>Arctic</sup> Willughby's char

→ 21. Salvelinus equassa (Girard) <sup>Ogusha trout</sup> Blueback trout

→ 22. Salvelinus aureolus (Bean) White trout (Breeding male)

→ 23. " " " " (Breeding female)

→ 24. Salvelinus fenthalis (Mitchill) <sup>Eastern</sup> Brook trout, Speckled trout

→ 25. Salvelinus fenthalis (Mitchill) <sup>(Maine variety)</sup> <sup>from</sup> Eastern Brook trout (Breeding female)

→ 26. Salvelinus fenthalis (Mitchill) <sup>(Maine variety)</sup> <sup>from</sup> Eastern Brook trout (Breeding male)

27. *Salvelinus fontinalis* (Mitchill) (New York variety) New York Brook trout

28. *Salvelinus fontinalis* Mitchill Brook trout

29. *Salvelinus malma* (Walbaum) Dolly Varden trout

30. *Cristivomer namaycush* (Walbaum) (Richardson) Sweet Lakes trout Mackinaw trout

31. Chart

32. *Oncorhynchus tshawytscha* (Steller) (Walbaum) Chinook salmon (Adult male)

33. *Oncorhynchus tshawytscha* (Steller) (Walbaum) Chinook salmon (Adult female) King salmon Chinook salmon

34. *Oncorhynchus nerka* (Steller) (Walbaum) Blueback salmon Red salmon (Adult male)

35. *Oncorhynchus nerka* (Steller) (Walbaum) Sockeye salmon Blueback salmon (Adult female)

36. *Oncorhynchus nerka* (Steller) (Walbaum) Red salmon Sockeye salmon (Breeding male)

37. *Oncorhynchus nerka* (Steller) (Walbaum) Red salmon (Breeding female)

38. *Oncorhynchus kisutch* (Steller) (Walbaum) Silver salmon or coho (Breeding male)

39. *Oncorhynchus kisutch* (Steller) (Walbaum) Silver salmon or coho (Breeding female)

40. *Oncorhynchus keta* (Steller) (Walbaum) Dog salmon Chum salmon (Breeding male)

41. *Oncorhynchus keta* (Steller) (Walbaum) Dog salmon (Breeding female)

42. *Oncorhynchus gorbuscha* (Steller) (Walbaum) Humpback salmon Pink salmon (Breeding male)

43. *Oncorhynchus gorbuscha* (Steller) (Walbaum) Humpback salmon (Breeding female) *clupeaformis* (Mitchill)

44. *Careogenus albus* (Lesueur) Common whitefish of Lake Erie

45. *Prosopium cylindraceum* (Richardson) Menominee whitefish

46. *Huso nigrirostris* (Cuvier and Valenciennes) Large-mouth bass

47. *Haemulon salmoides* (De Kay) The Grouper

*Huso salmoides* (Lacépède) Large-mouth bass

→ 48. Aplodinotus grunniens (Pafinesque) Fresh-water Drum or  
*oxyrhynchus* Mitchell American Gasperon

→ 49. Acipenser sturio (Linnaeus) Common sturgeon

→ 50. Amurus nebulosus (Lesueur) Common Catfish Brown bullhead.

→ 51. Lota maculosa (Lesueur) <sup>↑ lota</sup> Spotted burbot Bucktail Lawyer

→ 52. Alosa sapidissima (Cuvier) <sup>(Wilson)</sup> (Storax) Common Shad--American Shad *commersonii* (Lacépède). White

→ 53. Catostomus commersonii (Lesueur) Common sucker

→ 54. Lepomis macrochirus Rafinesque <sup>↑</sup> Bluegill

→ 55. Cyprinus carpio (Linnaeus) Common Carp

→ 56. Chart

→ 57. Huso <sup>↑</sup> Micropodus salmoides (Lacépède) Large-mouthed Black-Bass

→ 58. Micropodus dolomieu (Lacépède) Northern Small-mouthed Black-Bass

→ 59. Percus chrysops (Pafinesque) White Bass

→ 60. Percus lineatus (Bleek) Striped Bass or Peckfish

→ 61. Amblipistes rupestris (Pafinesque) <sup>↑</sup> Northern Rock bass -- redeye -- Goggle-eye

→ 62. Merone interrupta (Gill) Yellow Bass

→ 63. Merone americana (Gmelin) White Perch

→ 64. Pomoxys annularis (Pafinesque) White Crappie

→ 65. Pomoxys nigro-maculatus (Lesueur) Black Crappie

→ 66. Pomoxys sparsoides (Lacépède) Calico Bass

→ 67. Chaenobryttus coronarius (Bartram) Warmouth

→ 68. Perca flavescens (Mitchill) Yellow Perch -- Ringed Perch

→ 69. Archoplites interruptus (Gill) Sacramento Perch

→ 70. Stizostedion vitreum (Mitchill) Wall-eyed Pike -- Pike-Perch

→ 71. Stizostedion canadense (Smith) Sander -- Sand-Pike Gray pike

→ 72. Esox lucius (Linnaeus) Common Pike

→ 73. Esox americanus (Gmelin) Bulldog Banded Pickerel

→ 74. Esox nebulosus (Thompson) Maskinonge

→ 75. Esox niger Le Sueur Chain

→ 76. Esox reticulatus (Lesseuer) Common Eastern Pickerel

4

*Strongylura marina* (Walbaum) ~~Arctic~~ Billfish  
75. *Tylemorus longirostris* (Mitchill) ~~Arctic~~ ~~Carfish~~  
→ 76. *Leucichthys artedi* (Lesueur) ~~Jordan and Evermann~~ Lake ~~Menom~~ Herring  
→ 77. *Leucichthys artedi* (Lesueur) Erie Herring  
→ 78. *Leucichthys nigripinnis* (Gill) ~~Blackfin of Lake Michigan~~  
→ 79. *Thymallus signifer* (Richardson) ~~Alaska Grayling~~ -- Arctic Grayling  
→ 80. *Thymallus marmoratus* (Milner) <sup>Michigan</sup> ~~Montana~~ Grayling  
→ 81. *Thymallus tricolor* (Cope) Michigan Grayling  
→ 82. *Trachinotus carolinus* (Linnaeus) Common Pompano

NAMES OF EIGHTY-TWO FISH DESCRIBED IN PORTFOLIO

- ✓ 1. *Salmo salar* Linnaeus      Atlantic Salmon
- ✓ 2. *Salmo salar* Girard      Land-locked salmon (Breeding male)
- ✓ 3. "      "      "      "      "      (Breeding female)
- ✓ 4. *Salmo trutta* Linnaeus      Sea trout
- ✓ 5. *Salmo trutta* Linnaeus      European brown trout
- ✓ 6. *Salmo trutta levensis*      Walker      Lochleven trout
- ✓ 7. *Cristivomer namaycush* (Walbaum)      Lake trout (Doughty)
- ✓ 8. *Salmo clarkii* Richardson      Coast cutthroat trout
- ✓ 9. *Salmo clarkii* Richardson      Coast cutthroat trout
- ✓ 10. *Salmo clarkii* Gill and Jordan      Lohontan cutthroat
- ✓ 11. *Salmo regalis* Snyder      Royal silver trout
- ✓ 12. *Salmo gairdnerii* iridens Gibbons      Coast rainbow trout  
(steelhead phase)
- ✓ 13. *Salmo gairdnerii* Gibbons      Coast rainbow trout (rainbow phase)
- ✓ 14. *Salmo gairdnerii* Gibbons      Coast rainbow trout
- ✓ 15. *Salmo gairdnerii stenei* Jordan      Shasta trout
- ✓ 16. *Salmo gairdnerii gilberti* Jordan      Kern River trout
- ✓ 17. *Salmo whitei aqua bonita* Evermann      Soda Creek golden trout
- ✓ 18. *Salmo aqua bonita* Jordan      South Fork golden trout
- ✓ 19. *Salmo aqua bonita roosevelti* (Evermann)      Volcano Creek golden trout
- ✓ 20. *Salvelinus alpinus* (Linnaeus)      Arctic char
- ✓ 21. *Salvelinus oquassa* (Girard)      Oquassa trout
- 22. *Salvelinus amurellus* Bean      White trout (Breeding male)
- ✓ 23. "      "      "      "      "      "      (Breeding female)
- ✓ 24. *Salvelinus fontinalis* Mitchell      Speckled trout
- ✓ 25. *Salvelinus fontinalis* (Mitchill) from Maine Brook trout  
(Breeding female)
- 26. *Salvelinus fontinalis* (Mitchill) from Maine Brook trout  
(Breeding male)

- ✓ 27. *Salvelinus fontinalis* (Mitchill) (New York) Brook trout
- ✓ 28. *Salvelinus fontinalis* Mitchill Brook trout
- ✓ 29. *Salvelinus malma* (Walbaum) Dolly Varden trout
- ✓ 30. *Cristivomer namayeush* (Walbaum) Lake trout Mackinaw trout
- ✓ 31. Chart
- ✓ 32. *Oncorhynchus tshawytseha* (Walbaum) Chinook salmon (Adult male)
- ✓ 33. *Oncorhynchus tschawytscha* (Walbaum) Chinook salmon (Adult female) King salmon Quinnet salmon
- ✓ 34. *Oncorhynchus nerka* Walbaum Sockeye salmon Red salmon (Adult male)
- ✓ 35. *Oncorhynchus nerka* (Walbaum) Sockeye salmon (Adult female)
- ✓ 36. *Oncorhynchus nerka* (Walbaum) Sockeye salmon
- ✓ 37. *Oncorhynchus nerka* (Walbaum) Sockeye Breeding female
- ✓ 38. *Oncorhynchus kisutch* (Walbaum) Silver salmon or coho (Breeding male)
- ✓ 39. *Oncorhynchus kisutch* (Walbaum) Silver salmon or coho (Breeding female)
- ✓ 40. *Oncorhynchus keta* (Walbaum) Dog salmon Chum salmon (Breeding male)
- ✓ 41. *Oncorhynchus keta* (Walbaum) Dog salmon (Breeding female)
- ✓ 42. *Oncorhynchus gerbuscha* (Walbaum) Humpback salmon pink salmon (Breeding male)
- ✓ 43. *Oncorhynchus gerbuscha* (Walbaum) Humpback salmon (Breeding female)
- ✓ 44. *Coregenus clupeaformis* (Mitchill) Common whitefish
- ✓ 45. *Prosopium cylindraceum* (Richardson) Menominee whitefish
- ? ~ ✓ 46. *Huro salmoides* (Lacepede) Large-mouth bass (nigricans?)
- ? ~ 47. *Huro salmoides* (Lacepede) Large-mouth bass (Haemulon soloni)

48. *Apledinetus grunniens* (Rafinesque) Fresh-water drum or Aspergon

✓49. *Acipenser sturie oxyrhynchus* Mitchell American sturgeon

✓50. *Amelurus nebulosuo* (Lessneur) Brown bullhead

✓51. *Lota maculosa* (Lessneur) Bucbot Lawyer

✓52. *Alosa sapidissima* (Wilson) Common Shad--American Shad

✓53. *Catostomus commersonni* (Lacepede) White

✓54. *Lepomis macrochirus* Rafinesque Bluegill

✓55. *Cyprinus carpio* Linnaeus Carp

✓56. Chart

✓57. *Huro salmoides* (Lacepede) Large-mouth Bass

*two of  
these were  
on my father's* ✓58. *Microterus dolomien* (Lacepede) Northern small-mouth Bass

✓59. *Lepidemus chryseps* (Rafinesque) White-Bass

✓60. *Peccus saxatilio* (Walbaum) Striped Bass or Pockfish

✓61. *Ambloplites nipestris* (Rafinesque) Northern rockbass--redeye--Goggle-eye

✓62. *Moreno interrupta* Gill Yellow Bass

✓63. *Moreno americana* Gmelin White Perch

✓64. *Pomoxys annularis* Rafinesque White Crappie

✓65. *Pomoxys nigro-maculatus* (LeSueur) Black

✓66. *Chaenobryttus coronarius* (Bartram) Warmouth

✓67. *Perca flavescens* (Mitchill) Yellow Perch--Ringed Perch

✓68. *Archoplites interruptus* (Girard) Sacramento Perch

✓69. *Stizestedian vitreum* (Mitchill) Wall-eye--pike-perch  
canadense Smith

✓70. *Stizestedian vitreum* (XXXXXX) Sauger--Sant-Pike Gray pike

✓71. *Esex luxius* Linnaeus Common Pike

✓72. *Esex americanus* Gmelin Bulldog pickerel

✓73. *Esex masquinongy* Mitchell Muslekkung

? ✓74. *Esex niger* Le Sueur chain Pickerel

75. *Strongylura marina* (Walbaum) Billfish

✓ 76. *Leucichthys artedi artedi* (Le Sueur) Lake Herring  
Erie

✓ 77. *Leucichthys artedi albus* (Le Sueur) ~~XXX~~ Herring

✓ 78. *Leucichthys nigripinnis* (Gill) Michigan Blackfin

✓ 79. *Thymallus signifer* (Richardson) Arctic Grayling

? — 80. *Thymallus signifer tricolor* Cope Michigan Grayling  
,, *montanus* *montana grayling*

✓ 81. *Thymallus signifer tricolor* (Cope) Michigan Grayling

✓ 82. *Trachinetus carolinus* (Linnaeus) Common Pompano

P R E F A C E

The subject of Fish is of well nigh universal appeal. In old and young alike it arouses emotions of enjoyable anticipation or pleasurable memory. The scientist finds it a perpetual source of fruitful study and conjecture. The sportsman -- whether he be a rural lad with a home-made rod and a tin can of bait, who seeks the quiet pools in the country brooks (and brings home therefrom a long string of fish); or a mere dilettante in the art of angling; or one of those exalted personages who sit in the seats of the mighty and, with "his angle-rod made of a sturdy oak", equipped with expensive modern appliances, pursues his avocation of fisherman from the lofty deck of a <sup>man</sup>of-war -- each feels a thrill in the capture of his finny trophy unequalled by success in any other pastime. The epicure finds sensorial gratification when he savors the delicate aroma and incomparable flavor of a well-cooked piscatorial morsel, whose journey from its native waters to his table has been made in the shortest possible interval of time.

The author has personal recollections of many days whiled away in following the mountain brooks of eastern New York, canoeing on the lakes of northern Maine, and Canadian waters; and later, fishing such streams in California as boast of sufficient water to harbor the elusive trout. Leisurely excursions have also been made through the central and southern sections of our country.

The object of this book, however, is not the relation of more or less interesting reminiscences of fishing experiences; nor is it an attempt to compile an abridged encyclopedia, a handbook, or a complete list of American fish. The book is in no sense a biological, zoological, or historical pandect. Nothing comprehensive has here been attempted. The effort has been to

reproduce in colors, various types of American fish, as seen through an artist's eyes, -- a detailed, ocular description of their principal characteristics. Added thereto are a few brief data relative to each specimen illustrated.

In their native haunts these fish present a sublime display of color harmony. Their exquisite tints are at their best while alive in the water, or immediately after the catch is made. The colors of fish of the same species vary in different geographical areas, often in the same stream, according to whether the fish spend the greater part of their time in shady spots, or in open water, or over muddy, sandy or rocky bottoms. The character of food supply also affects their coloration.

Nomenclature of genera herein cited is based on the latest accepted scientific divisions; that of species on priority of names. Local designations are given when possible. In many instances the same local name is applied to widely different species in remotely separated places. Contrariwise, a single species may be known by several names, dependent on loci.

Authorities quoted are those recognized by leading ichthyologists. The published records, investigations and scientific conclusions of travelers, explorers and scholarly men of an earlier day, have been of inestimable assistance in the preparation of this volume.

Acknowledgement is gratefully made to all who have, in varied manner, rendered valuable aid to the author, in his attempt to successfully portray and describe those members of the biologically and ontogenetically interesting family of vertebrata herein presented.

*Miles Ernest Post*

## SALMONIDAE (Linnaeus)

The family Salmonidae belongs to the order Isospondyli, the least specialized of the orders of bony fishes. The group represents a high degree of development, adaptation to swift, cold waters, and varied instincts that reach the point of intelligence. Salmonidae are native to the North Temperate and Arctic regions and formerly abounded in those regions wherever suitable waters exist. Some, especially the larger species, are marine and anadromous; others are river fish which only enter salt water occasionally; still others are brook and lake fish.

Salmonidae have been separated at different times by earlier ichthyologists into more or less elastic genera of varying limits. The generic divisions commonly accepted at the present time were established by Doctor Theodore Nicholas Gill, who separated the family into two subdivisions: Coregoninae and Salmoninae. In the latter subdivision he included four genera: *Salmo*, *Oncorhynchus*, *Salvelinus*, *Cristivomer* and their immediate subgenera. The leading genus of these four is

### SALMO

The words "salmon" and "trout" are often used inaccurately to designate fish which are neither true salmon or true trout. This habit of loose nomenclature leads to frequent confusion. The genus *Salmo* includes the species of genuine salmon. Its subgenus, *Salmo trutta*, includes the European brown trout (*Salmo fario*) and the Lochleven trout (*Salmo caecifer*); also their American congeners, which inhabit the western part of North America.

The chief characteristics of fish which belong to the genus *Salmo* are: (1) Marine and anadromous salmon, with vomerine teeth little developed, no hyoid teeth, large scales, caudal fin

Salmonidae -- 2

forked when young, truncate in age; sexual distinctions strong, breeding males having lower jaw hooked upward. Such salmon are sometimes landlocked, in which event the native lake serves as their ocean.

(2) River-salmon, not anadromous, with vomerine teeth highly developed and sexual differences not strong. To the latter class belong the representatives of the subgenus, *Salmo trutta*.

Y  
SALMO SALAR (Linnaeus)

Atlantic Salmon

The Atlantic salmon is both a marine and a fresh-water fish. Except at the breeding season it is normally found near the mouth of one of the larger rivers. It is anadromous and in the breeding season ascends its chosen river to the spawning-beds, frequently near the head-waters of the stream. At a selected place the female, with her tail, makes a furrow in the bed of the river, in which she deposits her thousands of eggs. When these have been impregnated by her accompanying male, she carefully covers them with rapid sweeps of her tail. The spawning time of this fish is from three to twelve days, after which it returns to the sea. The young fish are hatched in 80 to 100 days.

*Salmo* *salar* is native to American and European waters. It is, perhaps, the best known of all game fishes and has long been a prime favorite of epicures. Pliny wrote of it in his *Naturalis Historia* in A.D. 77. It was popular with the early English. Its existence for centuries in Scandinavian and Russian waters has been established. On the American side of the Atlantic it is known from north of the Arctic circle to Cape Cod and in earlier days was taken in Long Island Sound. When John Cabot discovered Newfoundland in 1497, he found the salmon a common food of the native Indians, who captured it with wooden spears. Henry Hudson, in 1609, when he first described the river which bears his name, wrote: "Many salmon, mullets and rays very great"; and after passing the Highlands: "Great stores of salmon in the river".

For many years, on account of the construction of dams and manufactories in New England and New York, the salmon is seldom found in American waters south of Maine. It is more abundant in and near the St. Lawrence river and other Canadian affluents of the Atlantic. It is not markedly different from its European conspecifics. Its average weight is 10 to 15 pounds.

SALMO SEBAGO (Girard)

Landlocked Salmon (Breeding Male)

Salmo sebago derives its specific name from Sebago Lake, Maine, from which region it was first described. So far as known it is native only to four loci: The basins of Sebago Lake, Green Lake, Sebec Lake and St. Croix River. Fish cultural operations have further distributed it through the lakes of New England and New York. It is closely related to *Salmo ouananiche* of Canada and Labrador. These two are the only recognized of American landlocked salmon.

The largest specimens are taken from Sebago Lake, those from the St. Croix basin are reported to be the smallest. As a rule they are all smaller than the sea-salmon of either American or European coast. The landlocked salmon is proportionately fuller-formed than the sea-salmon, with larger scales and different coloration.

The habits of the landlocked species correspond to those of the sea-salmon. The lake is its ocean and it ascends the affluents of that lake to spawn. It does not die after spawning, but returns to the lake and seeks the deep water. In the breeding season it undergoes structural and chromatic changes, but its nuptial tints are less resplendent than are those of its salt-water relatives. The colors shown in the figure belong to the breeding season; at other times it is more silvery.

The landlocked salmon averages about 10 pounds in weight, but may attain 15 pounds and more. The specimen pictured was 19 inches long and was taken from Rangeley stream, Oquossoc, Maine.

3/ SALMO SEBAGO (Girard)

Landlocked Salmon (Breeding Female)

The colors of the breeding female of *Salmo sebago*, like those of the male, are less spectacular than are the breeding colors of the sea-salmon. The female at this season is slightly paler in tint than the male and has fewer, more widely separated spots. She, too, is more silvery at other times than in the spawning season.

The landlocked salmon of northern European lakes are not structurally or specifically different from the American *Salmo sebago*. They display only such variations as may be attributed to different water and bottom soil.

The female specimen here shown was taken, like the male, from Rangeley stream, Oquossoc, Maine. It measured 19 inches in length.

Y

SALMO TRUTTA (Couch)

Sea Trout

A native of European waters -- principally of Great Britain -- to which Couch gave specific rank and designated by the name of the subgenus, *trutta*. It is closely allied to *Salmo fario* and is rated by many ichthyologists as merely a larger variety of *Salmo fario*. It is a coastwise, anadromous fish.

5  
SALMO FARIO (Couch)

European Brown Trout

Though extensively imported and distributed in the clear streams of northern and central United States, this species is native to European waters, where it is known by various names: Common Brown Trout, European Brown Trout, German Brown Trout, Von Behr Trout and *Trutta fluviatilis*. Its color varies with its locus. It is often confused with the Lochleven trout of Scotland (*Salmo caecifer*, Yarrell) which, according to reliable authorities, is a separate species.

In the United States the Brown trout sometimes attains a weight of eight pounds. It is usually below that in its native waters.

✓  
SALMO CAECIFER (Yarrell)

Lochleven Trout

*Salmo caecifer* (sometimes designated *Salmo levenensis*) was formerly believed native only to the Scottish lake from which its popular name is derived.

That *Salmo caecifer* is specifically different from *Salmo fario* (with which it is often confused) has been decisively established by earlier naturalists, among whom are Doctor Parnell, William Yarrell, Sir John Richardson and Jonathan Couch. These eminent British authorities united in the assertion that the organic structure of the two trout is so widely at variance as to preclude their specific unity. An important difference between them is denoted by the specific name of the Lochleven trout (*Salmo caecifer*). The caeca number from 60 to 80 in this species, while the Brown trout (*Salmo fario*) has only about 40 caecal appendages. The flesh of *Salmo caecifer* is deep red.

Both species abound in the waters of Lochleven, but they are readily distinguished from each other, though exposed to the same local influences.

*Salmo caecifer*, like *Salmo fario*, has been introduced and extensively propagated in the United States.

7

SALMO CONFINIS (De Kay)

Lake Trout (Doughty)

Earlier writers often described this species, of which only occasional specimens are now seen. In 1842 De Kay wrote of it: "We may look for gradual but certain extirpation of this species."

In De Kay's time *Salmo confinis* (erroneously termed lake salmon or salmon trout) abounded in the lakes of northern New York. It was then an important article of commerce and, in thinly settled regions, of food.

*Salmo confinis* has a stout body, shorter and thicker than is characteristic of *Salmo* species. It frequents the deepest water in its native lakes and preys on smaller fish. Its flesh is rather coarse and tasteless. It measures 2 to 4 feet in length and averages 8 to 10 pounds in weight, though much larger, heavier specimens have been reported.

8/

## PACIFIC TROUT

The trout of Pacific waters are separated into three natural specific divisions: Cutthroat, Rainbow and Steelhead. Each division includes a number of species and intergraded varieties. A few species of each group are herein shown in sufficient external detail to identify any member of the group represented.

A striking characteristic of the Cutthroats is the deep-red or scarlet dash on each side, hidden below the inner edge of the dentary bone. The species generally conceded to be the type of the Cutthroat group is

*SALMO CLARKII* (Richardson)

Coast Cutthroat Trout

*Salmo clarkii* is native to Pacific coastwise streams and lakes from Northern California to British Columbia; and its variants are found in Alaska. It varies greatly in size and gamy qualities according to locus. Specimens are frequently taken in Oregon which weight 17 pounds, while those farther south average smaller. The Alaskan varieties are seldom as large as those taken in Oregon waters. The age at which the species matures also seems to be influenced by locality. In form it resembles the rainbow group, but is more somberly colored. It is less numerous in its native waters than are the rainbows.

The specific name was given in honor of William Clark, one of the leaders of the history making expedition of Lewis and Clark.

9

SALMO CLARKII (Richardson)

Alaska Cutthroat Trout

Sufficiently marked differences exist between the Alaska cutthroat and the Coast cutthroat to make them worthy of separate, individual notice, though the two are but variants of the same species. Both are profusely spotted with black, but the spots Alaskan variety averages more than its coast relative. In Alaska it is locally called blackspeckled and blackspotted trout. Its sides are more silvery than are those of the Pacific coast states and have a bronze overlay. Some specimens, but not all, show indistinct parr-marks. The Alaskan variety is of medium size; a specimen 15 inches long is unusual.

The first recorded fish of this species in Alaskan waters was caught by Doctor Bean in 1881. It was listed by him as *Salmo purpuratus*, but later study and investigation proved it to be a true cutthroat: *Salmo clarkii*.

10  
SALMO HENSHAWI (Gill and Jordan)

Lake Tahoe Trout

Indigenous to lakes and streams of interior drainage, this mountain trout varies in color according to locality. It is known in western Nevada and eastern California lakes and in streams on the eastern slope of the Sierras. It is especially plentiful in Lake Tahoe, as its popular name implies. It is also called Truckee trout, and, somewhat vaguely, Silver trout. Normally, it is silvery with widely separated spots. Its colors are brightest in the spawning season, from April to June. The female is somewhat lighter in tint than the male; otherwise it shows the same color design. Its area of habitation has been extended by artificial distribution and propagation.

Salmo henshawi reaches a weight of 3 to 6 pounds and is an important food and game fish.

SALMO TAHOENSIS (Jordan and Evermann)

Silver Trout of Lake Tahoe

The similarity of popular names leads to frequent misunderstanding in discussion of *Salmo tahoensis* (Silver trout of Lake Tahoe) and *Salmo henshawi* (Lake Tahoe trout). However, the specific variations between the two are more noticeable than is often the case in fish of widely separated habitat and different nomenclature.

*Salmo tahoensis* is a large, robust fish; it sometimes measures more than two feet in length and may attain a weight of 10 pounds. *Salmo henshawi* is smaller; it seldom weighs more than 6 pounds.

In the breeding season the male of *Salmo tahoensis* shows more brilliant nuptial colors; its sides become a deep, coppery shade. The male of *Salmo henshawi* changes color but slightly.

*Salmo tahoensis* is not anadromous; it inhabits the deeper waters of Lake Tahoe and the female spawns in the lake. *Salmo henshawi* is anadromous; the female seeks the shallow waters of the streams to spawn.

So far as is known, *Salmo tahoensis* is found only in the lake from which its name is derived. *Salmo henshawi* inhabits several different loci.

Except in the breeding season the color of *Salmo tahoensis* justifies its popular name of Silver trout. Seen in the clear, transparent water for which Lake Tahoe is noted, the gleaming sides of *Salmo tahoensis* in rapid motion, or the quick flash of light as it leaps in a graceful arc above the surface, will arouse the enthusiasm of artist, fisherman or any lover of natural beauty.

12

## STEELHEAD TROUT

In the fry and fingerling stages of growth it is difficult to distinguish trout of the Steelhead group from those of the Cutthroat group. Adult fish, however, show marked differences, and only the casual observer is inclined to doubt the specific identity of the two series.

Some of the steelheads are migratory and anadromous, like the salmon and ascend the rivers to spawn; others appear to live out their span of life in the deep waters of lakes. Their spawning season is prolonged and varies with locality.

The steelhead finds its center of abundance in the Columbia river. Its range extends from Santa Barbara County, California northward to British Columbia and Alaska. The type species of the group is

SALMO GAIRDNERI (Richardson)

Steelhead Trout

The characteristic feature of the entire Steelhead group is its comparatively small, hard head, hence its popular name. The attains sea-running species like *Salmo gairdneri* ~~attains~~ a large size and is commercially important. Its maximum weight is about 20 pounds. It does not die after spawning.

A subspecies of *Salmo gairdneri* (given specific rank by some ichthyologists and named *Salmo beardsleei* -- Jordan and Steele--) is not anadromous but lives entirely in the fresh waters of Crescent Lake, Washington.

In 1881 Doctor Bean reported *Salmo gairdneri* moderately abundant at Sitka, Alaska, also at Kodiak Island and in 1883 he found specimens at Mountain Lake near Mount Tongass.

13  
RAINBOW TROUT

At the present time the fish of the Rainbow Trout series are native to Alaskan waters, the mountain streams of the Pacific ~~XXXXX~~ States Coast ranges and the western slopes of the Sierra Nevada mountains. The assumption is safely made, however, that <sup>these</sup> in earlier geological periods, the range of ~~XXXX~~ fish, especially in the north, was much wider than we find it today. They differ from the cutthroats in their larger scales, brighter coloration and (usually) the absence of red marks on the throat. They are dissimilar to the steelhead series in their larger scales, smaller size and brighter coloration. The type species of the Rainbow series is

SALMO IRIDEUS (Gibbons)

Alaska Rainbow Trout

The rainbow trout was not officially reported from Alaska by any naturalist, until Doctor Tarleton H. Bean recorded it in 1881, though its presence in southeastern Alaska was known by various officers of government boats and by local fishermen. It prior to that time. is found in the Klawak river, the Naha stream, Cottonwood Creek, Lake McDonald and various other Alaskan waters. The lack of any official report in earlier years of its existence in Alaska doubtless was responsible for the idea, prevalent even yet in some quarters, that the rainbow trout is seldom found north of the Klamath river, and has been artificially transplanted to more northern points. A more reasonable and logical conclusion is that the Alaskan rainbow trout is the progenitor of all of the rainbows in Pacific waters.

The Alaskan representative of the species is one of the finest game fish known. It attains a length of two feet and a weight of five to eight pounds.

15  
SALMO IRIDEUS (Gibbons)

Coast Rainbow Trout

The Coast Rainbow Trout ranges from the Klamath river in  
in the south.  
the north to the San Luis Rey, San Diego county, California, / It  
inhabits the mountain streams and is occasionally landlocked in  
some of the brooks. Wherever landlocked, the fish is small and  
brilliantly colored. One of the most graceful and beautiful of  
Salmonidae, the coast rainbow is popular with sportsmen because of  
its gamy quality.

The species attains a length of 16 inches and occasional  
weight of six pounds, but is usually smaller, rarely heavier than  
two pounds.

15  
SALMO IRIDEUS STONEI (Jordan)

Stone's Trout

Also called Nissuee Trout, Noshee Trout and McCloud River Trout. This large, voracious fish inhabits the upper Sacramento basin, and is especially abundant in the McCloud River. Another species of rainbow (Salmo shasta -- Jordan -- )has been extensively propagated by fish culturists in the McCloud River and is also called McCloud River trout.

Salmo irideus stonei is larger than the typical irideus and is considered by many to be merely a variant of Salmo irideus. It attains a weight of 10 to 12 pounds and is less brilliantly colored than some of the rainbow series. In cold mountain streams it is more gamy than in the warmer waters nearer the coast.

Salmo irideus stonei is named for Livingston Stone, naturalist and fish culturist.

16

SALMO IRIDEUS GILBERTI (Jordan)

Kern River Trout

Limited to the waters of Kern River, California -- except where artificially transported and propagated -- *Salmo irideus gilberti* has unusually small scales, a robust body and a moderately large mouth. It is abundant in the river channels, is gamy and voracious. It attains a weight of 8 pounds but its average weight is less. Though known only from Kern River, its specific distinction is doubtful, as it closely resembles *Salmo shasta*; and by many sportsmen and others the two species are considered the same.

17  
SALMO WHITEI (EVERMANN)

Soda Creek Golden Trout

The various "golden trout" of the Pacific Coast states are sufficiently alike to justify the descriptive word "golden" for the entire group. They belong to the Rainbow series. Notwithstanding their close relationship and superficial resemblance, their differences are so marked as to entitle them to specific isolation or, at least, separation into phases, each phase bearing its individual specific nomenclature.

The golden trout are brilliantly colored. The characteristic features of the Soda Creek species are the small black spots on the head and sides. The parr-marks are always present; in most of the other species they grow indistinct in age or disappear completely.

The Soda Creek species (*Salmo whitei*) is specifically named in honor of Stewart Edward White, noted author, sportsman and naturalist.

18  
SALMO AGUA BONITA (Jordan)

South Fork Golden Trout

This species resembles the golden trout of Soda Creek, but its scales are larger and its coloration is more brilliant. Individual specimens exhibit considerable chromatic variation, but the general type and color scheme is persistent. In its home waters and in other small streams and lakes its parr-marks are permanent. In larger lakes to which it has become inured, the parr-marks almost or entirely disappear.

The specific name, *Salmo agua bonita*, refers to Agua Bonita Falls in Volcano Creek, where the type was formerly (but erroneously) reputed to originate. Ichthyologists now assert that it is native to the South Fork of Kern River. It has been introduced and successfully habituated to other streams and lakes.

19  
SALMO ROOSEVELTI (Evermann)

Volcano Creek Golden Trout

Native only to Volcano Creek, a tributary of Kern River, California, this isolated species inhabits the colder waters of the creek at an elevation of 10,000 feet, where high falls prevent the ascension of other species of trout and discourage downward passage of fish away from their native waters.

Doctor Barton W. Evermann named this trout in honor of former President Theodore Roosevelt, who was, from his youth, a lover of the great outdoors, a hunter of renown and an ardent disciple of Izaak Walton.

Like the distinguished personage whose name it bears, *Salmo roosevelti* possesses individual characteristics which render its identification simple. Its colors are brilliant, especially its deep-rose lateral band; its blue-black parr-marks are large and distinct; its scales are small and delicate.

Because of its beauty as a sportsman's trophy and its highly edible quality, this trout is a prize much sought by fishermen. Only careful conservation, rigidly enforced, will prevent extinction of the species.

27  
SALVELINUS (Richardson)

THE CHARS

Formerly included in the genus *Salmo*, the chars are among the most active and beautiful game fish. Though not true trout, they are popularly termed trout, usually with a qualifying descriptive word or phrase. The word char is from the Gaelic, *ceara*, meaning red, blood-colored. The genus *Salvelinus* was established in 1836 by Sir John Richardson, who thus generically separated the chars from the true trout. The chars are distinguished by the boat-shaped vomer, without teeth in its shaft. The type of the genus is the European *Salmo salvelinus* of Linnaeus, now known as

SALVELINUS ALPINUS (Cuvier)

~~Willoughby's char~~  
Willughby's Char

*Salvelinus alpinus* is the only species of char generally recognized in Europe. It has many variations but none which entitle it to specific differentiation in the opinion of leading ichthyologists. Before Richardson established the genus *Salvelinus*, it was named *Salmo umbla*, and sometimes *Salmo umbla minor*. The Windermere char and the Welsh *torgoch* or Welsh redbelly are local varieties. *Salvelinus alpinus* inhabits the clear, cold waters of Switzerland, Germany, the Scandinavian countries and Great Britain. It is also known, rather vaguely, as the little salmon.

2/

SALVELINUS OQUASSA (Girard)

Blueback Trout

Once plentiful in the Rangeley group of lakes in Western Maine, this beautiful fish is now almost, if not quite, extinct in those lakes. Doctor W. C. Kendall, noted ichthyologist of Freeport, Maine, reports that a few small specimens, identified as *Salvelinus oquassa*, have been taken in Rainbow Lake, Maine. Even smaller varieties are said to exist in the lakes of Quebec and of subarctic America.

The brilliant, dark-blue color, enlivened by small, bright-red spots, renders this one of the most attractive of our native chars. Its near extinction in its native haunts is regrettable.

The average length of *Salvelinus oquassa* is 10 to 14 inches; and its weight one to two pounds.

22  
SALVELINUS AUREOLUS (Bean)

White Trout (Breeding Male)

The native loci of *Salvelinus aureolus* -- also called American saibling -- are restricted to a few of the colder waters of New England. It spawns late in the fall and frequents the deep waters of lakes and large ponds where the bottom temperature varies from 38° to 52° F. according to depth.

The bright colors shown in the illustration are those of the breeding season. At other times the colors are paler and silvery, hence its popular name of White trout, at Sunapee Lake, New Hampshire. It is noted in a few other New Hampshire lakes and in one of the Averill ponds in northern Vermont. At Flood's Pond, Maine, it is called the Silver trout.

Doctor John Duncan Quackenbos, physician and author, who maintained summer headquarters at Lake Sunapee for many years, was among the first to disseminate knowledge of the White trout. Doctor Quackenbos gave the extreme authentic weight of *Salvelinus aureolus* as 12 pounds. Unconfirmed reports exist of specimens which weighed 15 to 20 pounds. As a rule the size decreases in the higher altitudes, but the coloration is there more vivid.

83/

SALVELINUS AUREOLUS (Bean)

White Trout (Breeding Female)

The colors of the breeding female of *Salvelinus aureolus* are more delicate and less vivid than those of the male. At other times her colors, like those of the male, are pale and silvery.

The species is unusually hardy and prolific. According to Doctor Quackenbos, the female spawn averages 1200 eggs to the pound; the fish begins to cast spawn when it is only two ounces in weight. The eggs stand transportation without damage and efforts have been made, through fish cultural operations, to introduce the species into other northern deep lakes and ponds.

24  
SALVELINUS FONTINALIS (Mitchill)

Eastern Brook Trout

For years celebrated in song and story as the "speckled beauty", *Salvelinus fontinalis* is, perhaps, more widely known to the world's sportsmen than any other game fish. Its original native haunts are the mountain streams from Maine to Georgia and Alabama in the east; westward through the Great Lakes to Minnesota in northern United States and from Labrador to the Saskatchewan in Canada. Its gamy qualities endear it to anglers and its delicious flavor to epicures. It is so assiduously sought that it would long since have been exterminated had it not been artificially distributed and propagated throughout the country, even to the Pacific coast. It thrives only in clear, cold water, with gravelly bottom, frequent shady spots, occasional rapids and deep pools. Artificially hatched and artificially fed, *Salvelinus fontinalis* bears little resemblance to its vivid, flashing progenitor of the less frequently fished streams of an earlier day.

*Salvelinus fontinalis* spawns late in the fall, at which time its most brilliant colors appear. It varies in length from 10 to 18 inches and in weight from 2 to 8 pounds.

25

SALVELINUS FONTINALIS (Mitchill) Maine Variety)

Eastern Brook Trout (Breeding Female)

The spawning season of *Salvelinus fontinalis* in New England and New York extends into October and November, even later in some seasons. The spawning beds are usually selected in shallow water with gravelly bottom. The number of eggs varies with age and size of the female. A yearling female usually spawns from 150 to 250 eggs; a two-year-old 350 to 500; older females may produce 1500. The specimen shown was taken at Rangeley Stream, Oquossoc, Maine and measured 16.5 inches in length.

The breeding colors of the female are not as brilliant as those of the male. According to Doctor Kendall, the blue color on the belly of this ~~spotted~~ female, is unusual.

26

SALVELINUS FONTINALIS (Mitchill) (Maine Variety)

Eastern Brook Trout (Breeding Male)

*fontinalis*  
Salvelinus/illustrates the influence of local conditions on any given species. The specimen herewith portrayed was taken at Parmacheenee Falls, Maine, (Magalloway river) just prior to the breeding season, when his nuptial colors had almost attained their brightest hues. In some local varieties of *Salvelinus fontinalis* the tail of the adult male is slightly lunate; in the specimen pictured it is noticeably truncate.

Data relative to *Salvelinus fontinalis*, *Salvelinus aureolus*, *Salvelinus equassa* and *Salmo sebago* were supplied the author through the courtesy of Doctor William C. Kendall, Freeport, Maine, an unquestioned authority on subjects ichthyological.

27

SALVELINUS FONTINALIS (Mitchill) (New York Variety)

New York Brook Trout

A variety of *Salvelinus fontinalis* which gained its  
popular name of New York Brook Trout ~~because of~~ its chromatic  
variation and its one-time abundance in the clear, cold streams of  
northern New York. The sportsmen of that state are wont to  
assert that the colors of *Salvelinus fontinalis* <sup>there</sup> are/brighter and  
its size greater than the same species of any other eastern region  
can display.

The colors here depicted are not those of the breeding  
season.

28  
SALVELINUS ERYTHROGASTER (De Kay)

Red-bellied Trout

De Kay, who described this species in 1842, classified it as *Salmo erythrogaster*. As it obviously belongs to the genus *Salvelinus* (which De Kay did not recognize) it is here placed in that genus, with De Kay's specific name, *erythrogaster*. It is not identical with the <sup>European</sup> variety of *Salvelinus alpinus* known as Welsh *torgoch* or Welsh *redbelly*.

Formerly abundant in the larger brooks and smaller rivers of New York and Pennsylvania, affluents of lakes, this species is the prey of larger lake fish, hence is seldom found in the lakes, but frequents the rapids above waterfalls and the deep pools below them. Its natural enemies and sportsmen have combined to cause the present-day scarcity of this beautiful fish.

*Salvelinus erythrogaster* is among the larger species of the genus. Its length is from 15 to 20 inches and its weight 2 to 6 pounds. Its colors are bright and its flesh carmine red. Some authorities attribute the ruddy color of its flesh to its food supply, which consists largely of fresh-water shrimps and other small crustacea.

29

SALVELINUS MALMA (Walbaum)

Dolly Varden Trout

This colorful and lively species inhabits the mountain streams of western North America from the upper Sacramento river in California to Montana, Idaho, Oregon, Washington and Alaska. It is native only to Pacific drainage waters and is the only species of *Salvelinus* which occurs in California without previous importation. It abounds in the lakes and streams of Alaska and there attains its largest size. In those waters it averages 8 to 12 pounds with an occasional extreme specimen of 25 pounds. Its specific name of *malma* is of Kamchatkan origin. Its popular name, Dolly Varden, refers to its bright color spots, that are reminiscent of the gowns worn by the lovable little character who danced her gay life through the pages of Dickens' *Barnaby Rudge*.

The species is generally anadromous, but in Dewey lake, near Skagway, which is said to be inaccessible to fish from the sea, *Salvelinus malma* occurs in considerable numbers and is of unusual color brilliance. Professor Edward D. Cope, in 1875, reported it in a small stream on Unalaska island, above a series of impassable cascades. He considered it a new species, and because of its fancied hammer-shape, named it *Salvelinus tudes*.

Some authorities aver that the Dolly Varden of Alaska is sufficiently different from the Dolly Varden of the Pacific coast states to warrant specific separation and have named the latter representatives *Salvelinus parkei* (Suckley). Others are of the opinion (which the author shares) that the *Salvelinus tudes* of Cope and *Salvelinus parkei* of Suckley are merely varieties of *Salvelinus malma*.

CRISTIVOMER (Gill and Jordan)

The genus *Cristivomer* includes only two species which  
each other resemble closely: *Cristivomer namaycush* and *Cristivomer siscowet*.

Both are really large chars which differ from *Salvelinus* in having a raised crest behind the head of the vomer and free from its shaft. The crest is also armed with teeth. The *Cristivomers* differ further from *Salvelinus* species in their spots, which are gray instead of red. The type species is

CRISTIVOMER NAMAYCUSH (Richardson)

Great Lakes Trout -- Mackinaw Trout

The specific name of *Cristivomer namaycush* is an Indian word derived from namekus, which in the Algonquian Cree dialect signifies trout. In Maine the fish is called togue. Its range extends from New Brunswick and Maine westward through the Great Lakes region to Vancouver Island, and northward to northern Alaska. It is also found in Hudson Bay and Labrador. It is the largest of all the chars and attains a length of several feet and a maximum weight of more than 100 pounds. The specimens taken by sportsmen and commercial fishermen are usually much smaller, about 15 to 25 pounds in weight. Sir John Richardson reported catching ~~XXX~~ namaycush in 1849 of 50 pounds weight as an ordinary catch. In 1820 Sir John Franklin reported the "common trout or nammaecous weighing upwards of sixty pounds".

*Cristivomer namaycush* has a longer, more slender body than *Cristivomer siscowet*; its skin is thin and the flesh has no over-development of fatty tissue. *Cristivomer siscowet* has a deeper ~~xxxxxx~~ body, thicker skin and an excessive amount of fatty tissue.

37

ONCORHYNCHUS (Steller)

Those fish of Pacific waters popularly and commercially known as Pacific salmon, were first segregated in the genus *Oncorhynchus* by Doctor William Steller, German physician and naturalist of Bering's Arctic expedition of 1740-1742. Though Doctor Steller's observations were made under adverse, often desperate conditions, they were careful and exact and are valuable contributions to the natural history of the Pacific coast, both in relation to animal life now extinct and that which still survives. His authentic records were published in 1749, after his death, by the Academy of St. Petersburg. They were published again in Halle in 1753; and a third time in 1768.

Doctor Steller divided his genus *Oncorhynchus* into six species and described them with perfect accuracy under their Russian vernacular names. In 1792 these Russian names were adopted by Walbaum as specific names in scientific nomenclature.

*Oncorhynchus* is a Latin word derived from the Greek *onkos* (hook) + *rhynchos* (snout).

The six species are: (1) *Oncorhynchus tschawytscha* (Chinook salmon); (2) *Oncorhynchus nerka* (red salmon or blueback); (3) *Oncorhynchus kisutch* (silver salmon or coho); (4) *Oncorhynchus keta* (dog salmon; the *sake* of Japan); (5) *Oncorhynchus gorbuscha* (humpback or pink salmon); (6) *Oncorhynchus masou* (or masu) of Japan.

With isolated exceptions, for some reason or cause not satisfactorily determined, all of the *Oncorhynchus* species, male and female alike, survive only one spawning season.

37  
ONCORHYNCHUS TSCHAWYTSCHA (Steller) (Walbaum)

Chinook Salmon (Adult Male)

Oncorhynchus tschawytscha has a wide variety of popular names. In Russia it is called tschavitche; in Alaska, king salmon or spring salmon; on the Fraser river and Puget Sound, Chinook salmon; on the Columbia river, royal chinook and Columbia river salmon; in California, Sacramento salmon. Some of the Lower Chinook Indians term it tyee (chief); others, quinnat. According to the anthropologist, Boas, the upper Chinook version is igunat.

This species is widely distributed. It occurs on both coasts of the Pacific from Monterey Bay (possibly further south) on the American side; and from China on the Asiatic side, northward to the Arctic Ocean. It ascends all of the large streams but is less plentiful in Alaska than any other of the species.

The color of the flesh varies in this species. Some of the fish have the rich, red flesh prized by packers; others are white-meated. The percentage of white-meated specimens seems to be larger in Alaska than it is farther south. The Columbia river fish are mostly red-meated.

The size of the species varies. Doctor Tarleton H. Bean, reliable ichthyological authority, who studied his subjects at first hand, stated that "Individuals weighing over 100 pounds are on record." Those taken to the canneries (some of them immature) average about 40 inches in length and 25 to 30 pounds in weight.

Sexual differences are less noticeable than in some of the other species. The male has definitely hooked jaws and more prominent teeth than the female.

33  
ONCORHYNCHUS TSCHAWYTSCHA (Steller) (Walbaum)

Chinook Salmon (Adult Female)

The female of this species has a delicately tinted, well-shaped, symmetrical form, slightly shorter and fuller-bodied than the average male, with little difference in weight. Observations indicate that the female will not spawn in warmer water than 54° F. If the spawning bed is reached while the water is of higher temperature, spawning does not occur until the water has cooled. Few, if any, of either sex survive the spawning season.

For many years *Oncorhynchus tschawytscha* was considered of little commercial value. Its utilization by canners and dealers has increased until it now has high rank among fish of commercial importance.

34  
ONCORHYNCHUS NERKA (Steller) (Walbaum)

Blueback Salmon (Adult Male)

Other popular names for this fish are Red Salmon, Redfish, and Sockeye; the latter-named is from the coast of Humboldt county, California, but if it is actually identical with the blueback is questionable. Undoubtedly the Red Salmon and the Redfish are the same as the blueback.

The species is widely distributed. It has been reported (without confirmation) from the Sacramento river. Its known range on the American coast is from Southern Oregon to Bering Sea. The Columbia is the most southern river where it is known to run in large numbers.

The blueback is the most symmetrical of the *Oncorhynchus*. Its color change during the breeding season is more marked than in other species. Fresh from the sea, before the up-river run has advanced, it is clear blue on the back and upper part of the sides, hence its popular name, blueback. As the season advances its color changes to deep-red, when it is termed the Red salmon or Redfish.

In size the blueback ranks third among the *Oncorhynchus*. The male's average length is 27 to 32 inches; weight 8 to 10 pounds. Larger specimens are often reported, but an effort is here made to give an average size and weight.

3/5  
ONCORHYNCHUS NERKA (Steller) (Walbaum)

Blueback Salmon (Adult Female)

The female blueback, prior to the breeding season, is longer and more slender than the male, but shares her mate's symmetry and general neatness of form. The pre-mating colors of the sexes show little difference.

The species is peculiar in that it never or rarely ascends a stream which is without one or more lakes at its headwaters. The spawning beds are chosen in small streams tributary to the lakes, seldom in the lakes. Exceptions occur so infrequently that they may be said to prove the rule.

37

ONCORHYNCHUS NEFKA (Steller) (Walbaum)

Red Salmon ~~(Adult Male)~~ (Breeding Male)

The Red salmon or Redfish is identical with the Blueback. Its red color is merely the change in hue of the breeding season. Soon after entering a stream on its way to the spawning beds, the color of the male's head changes to olive, the back and sides to crimson, later to blood-red; the usual prolongation of the jaws and emphasized hook of the snout takes place; the teeth increase in size; the flesh becomes spongy; the scales embedded and the back a little humped, but not so prominently as in *Oncorhynchus gorbuscha*.

The bright-red color of the flesh makes this fish popular with canners.

37

ONCOPHYNCHUS NERKA (Steller) (Walbaum)

Red Salmon (~~Adult Female~~) (Breeding Female)

The breeding female of the Red salmon or Redfish changes color from blue to red, as does her mate, soon after entering a stream en route to the spawning beds, but her colors are less rich than those of the male. Her symmetrical outline of body and head shows no trace of the elongated jaw and deforming hump characteristic of the male.

inadvertently

If a Red salmon or Blueback enters a stream unconnected with a lake, it promptly returns to the sea or to another fork of the stream which leads to a lake. No satisfactory explanation of or reason for this peculiar trait is known.

38  
ONCORHYNCHUS KISUTCH (Steller) (Walbaum)

Silver Salmon or Coho ~~Kadukko Malek~~ (Breeding Male)

Half-breed Indians of the North are responsible for the vernacular title of coho, by which name *Oncorhynchus kisutch* is most often known in Alaska. It is common in the Pacific coast/<sup>waters</sup> from Monterey Bay, California, northward to Karluk, possibly beyond. It is also found in Japan. Normally it is the last of the *Oncorhynchus* to appear in the rivers; the run usually begins after the other species have gone.

In the breeding season the silvery sides of the male change to a roseate hue, with the prolongation of the snout and jaws common to the male of *Oncorhynchus* species.

*Oncorhynchus kisutch* averages a length of 28 to 33 inches and weight of 8 to 12 pounds.

39

ONCORHYNCHUS KISUTCH (Steller) (Walbaum)

Silver Salmon or Coho (~~AdultxFemale~~  
(Breeding Female)

The female of this species resembles the male in color, except in the breeding season, when the latter changes more noticeably to deeper, brighter tints. The female outline is more gracefully curved and the head is fuller, without the incipiently prolonged snout, which later becomes pronounced in the male.

As a food fish *Oncorhynchus kisutch* takes high rank. Its flesh is lighter colored and less firm than that of the Redfish or the Chinook, but its flavor is excellent and it is now a commercial favorite.

10/

ONCORHYNCHUS KETA (Steller) (Walbaum)

Dog Salmon ~~Adult Male~~ (Breeding Male)

The popular name of this fish, Dog salmon, is so commonly applied to other species that it means little to those unfamiliar with *Oncorhynchus keta*. In general parlance, the male of any species is a "dog" salmon.

*Oncorhynchus* ranges from San Francisco northward to Bering Strait. Because of its abundance it is of great value to the Eskimo natives on the shores of Bering Sea. It is the principal salmon in Japanese waters where it is called sake. (As sake is a Japanese alcoholic beverage which contains a heavy proportion of fusel oil, the name may possibly be applied to this fish because of its heavy, oily flesh.) The Russian vernacular names are hayko and lekai; the American coastal trade name is chum.

When fresh from the sea *Oncorhynchus keta* is a plump, handsome fish; it closely resembles *Oncorhynchus kisutch*. As the breeding season advances, the male loses much of his beauty; his jaws become elongated and distorted and his teeth show prominently.

*Oncorhynchus keta* appears to prefer the smaller coastal streams for its spawning beds. Its run is at its height in September. The average length of the fish is 29 inches and its weight 9 to 10 pounds. Males are occasionally taken 35 inches long, which weigh about 16 pounds.

WY

ONCORHYNCHUS KETA (Steller) (Walbaum)

Dog Salmon ~~reddish~~ (Breeding Female)

The female of this species, like the male, loses much of her gleaming beauty in the mating season. Both sexes are readily distinguished from other *Oncorhynchus* by their peculiar lateral markings which resemble a roughly sketched landscape.

The difference in length and weight of male and female specimens is slight. An unusually large female may be 33 inches long and weigh 15 pounds.

*Oncorhynchus keta* is highly valued and utilized by the Japanese as a food fish. In recent years it has gained popularity with American packers and is now a commercial asset. The flesh is soft, spongy and rather light-colored, but is nutritious and wholesome.

47  
ONCORHYNCHUS GORBUSCHA (Steller) (Walbaum)

Humpback Salmon ~~Adult Male~~ (Breeding Male)

The humpback is one of the smaller of the *Oncorhynchus* family. It averages less than two feet in length and four to five pounds in weight, with an occasional eight-pound male. Because of the peculiar formation of the male fish during the breeding season the popular name of humpback designates this species. As this season advances the sexual difference in appearance increases. The body of the male becomes more compressed and deeper at the shoulders, so that a distinct hump is formed. (This occurs to some extent in all of the *Oncorhynchus* species but is more extreme in *Oncorhynchus gorbuscha* than in any of the others.) Both jaws become prolonged, the upper one somewhat hooked. The mating colors are deeper and more brilliant than in other seasons.

The humpback is sometimes called dog salmon, but the name is erroneous, as the true dog salmon is *Oncorhynchus keta*. The Nisqualli Indians (Salishan stock) give the humpback the local name of huddoh and sometimes haddo.

WY  
ONCORHYNCHUS GORBUSCHA (Steller) (Walbaum)

Humpback Salmon ~~Adults~~<sup>Female</sup> (Breeding Female)

*Oncorhynchus gorbuscha* does not frequent the larger rivers of the Pacific coast, but is found in smaller streams from Northern California to Bering Sea. Because of its small size it is able to spawn in shallow water. It does not ascend the streams to a distance far from the sea but may reach the headwaters of some of the shorter rivers. In years of greatest abundance it appears in such large schools that the pools below the falls of streams it ascends are sometimes congested, and many fish die before spawning.

The female humpback, before mating, has the same general color scheme as the male, but is more delicately tinted. Her colors brighten during the breeding season, but she preserves her symmetrical, graceful shape, which is plumper than that of the male.

The flesh of the humpback is a light-pink color, softer than that of the red-fleshed species. In earlier years it was not highly esteemed for canning. Later, enterprising canners utilized it under a "pink salmon" label and some large canneries now pack it exclusively. It is delicious, nutritious and wholesome when canned. When taken direct from the sea it is regarded as superior for fresh consumption. Salted, it ranks high. Salted humpback bellies are esteemed a delicacy.

COREGONUS (ARTEDI)

The Whitefishes

The Whitefishes belong to the Coregoninae tribe, a subfamily of Salmonidae. This subfamily includes the Whitefishes and the lake herrings, — and is divided into three genera, of which the leading genus is *Coregonus*, established by the youthful Artedi, ichthyologist, who, in his short life of thirty years, assembled the material for his great work, *Ichthyologica*, published after his death by his close friend, Linnaeus. According to Cuvier, this first work gave a truly scientific character to the study of fish life.

The genus *Coregonus* includes eight species, among the more important of which is

COREGONUS ALBUS (Lesueur)

Common Whitefish of Lake Erie

Though named by Lesueur, this species was first described by Sir John Richardson. Its native habitat is Lake Erie and Lake St. Clair, but it has been/introduced into other lakes. Its habits are more sluggish and its flesh is noticeably lighter in color, softer and oilier than that of the whitefish in the deeper, colder lakes. The difference is generally attributed to the influence of the warmer, more shallow waters of Lake Erie. Some consider observers/*Coregonus albus* as a doubtful species, while others assert that even the young, small fry can be readily distinguished from the young of other species. This seems to establish its right to individual classification. It attains a length of 18 to 20 inches and a weight of 1 to 2 pounds.

45/

COREGONUS QUADRILATERALIS (Richardson)

Menominee Whitefish

Other names by which this species is known are pilot-fish, round whitefish, shadwater, chivey and blackjack. It is common in Lake Superior and Lake Michigan, and is found in lakes from the Yukon basin in Alaska to northern New England. It is not abundant in the Winnipeg basin. In Alaska it is considered a good food fish, but is not valued as such in the northern United States. It is readily known by <sup>its</sup> short head and slightly compressed body, which is more conical than in other *Coregonus* species.

*Coregonus quadrilateralis* reaches a length of 12 to 15 inches and a weight of two pounds.

Sir John Richardson, who named the species which he found on his expedition with Sir John Franklin, relates a legend of the Chippewa Indians to the effect that the whitefish originated at the outlet of Lake Superior, from the scattered brains of a woman whose head, for some misconduct of the woman, was doomed to wander by itself through the country. Coming to the Falls of St. Mary, the head was dashed to pieces. A crane, exercising the power often attributed to birds and animals by American aborigines, transformed the particles of brain into the roe of a whitefish, for the benefit of the Indian nations.

W<sup>b</sup>

HURO (Cuvier) ~~and Valenciennes~~

The genus Huro was established by Cuvier as a subdivision of Percidae, (The Perch Family). It includes ~~the~~ those North American fish which possess many characteristics of a true perch, but are without teeth in the *praeoperculum*. A fish typical of the genus is

HURO NIGRICANS (Cuvier and Valenciennes)

Black Huron

The fishermen of Lake Huron loosely term this fish a black bass, though it has not the characteristics of a bass. It is dark-colored, which fact, in conjunction with its native locus, gives it the popular name of Black Huron. Except for the generic difference of absence of teeth in the *praeoperculum*, it closely resembles a true perch. Sir John Richardson described it under the name of *Perca (Huro) nigricans*. Its flesh is exceptionally firm and well-flavored. It attains a length of about 18 inches.

HAEMULON (Cuvier)

The Grunts

The genus *Haemulon* was established by Cuvier to include a number of fish species with red ~~xxxxxx~~ lips and the inside of the mouth usually bright red. Popular names for the fish of this genus are redmouth, grunter, growler, grunt and ronco. They represent many species, all American and all valuable food fish. Most of them are native to the tropical and semi-tropical regions. The species which seems to have the farthest northern range is

HAEMULON SALMOIDES (De Kay)

The Growler

Authentic accounts record this species as far north as Indiana, though not abundant in that region. In the Carolinas it is said to attain a length of two feet. The name of growler or grunter is common to a number of the *Haemulon* species because of a peculiar, grunting sound made by the fish when first taken from the water or when fighting the hook. For the same reason it is sometimes locally called pigfish.

18/

HAPLODINOTUS (Rafinesque)

Drumfish

Various fish of the Sciaenidae family are known as drums because of a noise made by many of the species when under water which resembles a drum-roll. Opinions differ as to the cause of this sound. Cuvier believed it due to the transfer of air to the different compartments of the air-bladder. Fishermen frequently attribute it to friction of the broad pharyngeal teeth, especially latter in the case of salt-water drums. The ~~xxxxxxxxxxxx~~ belong to the genus *Pogonias* (Lacépède). They are adorned with barbels and are larger than their fresh-water relative, the

HAPLODINOTUS GRUNNIENS (Rafinesque)

Fresh-water Drum or Gaspergou.

The genus *Haplodinotus* is monotypic. Its one species is native to the Great Lakes, the Mississippi river and its larger tributaries. It is a bottom fish and feeds largely on mollusks and small crustaceans. It bears the various local names of croaker, sheepshead and thunderpumper. It is of gamy nature and is considered a good food fish in the South, but is not highly esteemed as such in the north. Though smaller than the salt-water drumfish, it is one of the largest of our fresh water fish. It attains a length of four feet and occasionally a weight of 60 pounds.

47  
ACIPENSER (Linnaeus)

Sturgeons

The Sturgeon family is represented in North American, European and Asiatic waters. Pliny says that among the ancients the Acipenser was considered the noblest of fishes, though it ceased to be so esteemed before his time. The genus includes about ten species; nearly all of them are commercially valuable, for their flesh and as the source of caviar and isinglass.

Sturgeons differ externally and internally from other fan-finned fish. The skeleton is almost entirely cartilaginous instead of bony; the body is either naked or covered with bony bucklers; the snout is lengthened into a shovel-like appendage or beak. Five species inhabit North American waters, One of the most important is the type species,

ACIPENSER STURIO (Linnaeus)

Common Sturgeon

*Acipenser sturio*, the common sturgeon of North American and European rivers and coasts, was long ago named a "royal fish" in English acts of Parliament. In the time of Edward I the entire sturgeon was declared to belong to the king, by virtue of his royal privilege. In the reign of Edward II the statutes were amended to exclude all purchased sturgeons and those not taken in the sea. In the United States, however, it was not especially valued until about the middle of the nineteenth century.

*Acipenser sturio* is a migratory, anadromous fish, which spends a large proportion of its life in salt water near the coast and ascends the rivers to brackish or fresh water to spawn. It ranges from Maine to South Carolina and is most abundant in Delaware coastal waters. Its maximum length is about 10 feet. It is reported to attain a weight of 600 pounds.

AMIURUS (Rafinesque)

Catfish

The name of catfish has been given in the United States to those representatives of the Siluridae which, when taken from the water, emit a sound like a cat's purr. The North American catfish have naked, scaleless skin and have been referred to five genera: *Amiurus*, *Gronias*, *Ictalurus*, *Leptops* and *Noturus*. The genus *Amiurus* was established by Rafinesque in 1820 (his spelling, *Ameiurus*) and includes a number of variable species, some of which resemble ~~xxxxxx~~ each other closely, so that accurate identification is at times difficult. None of the species are native to the Pacific coast, but a few have been introduced there and are now found in considerable numbers. The two species most abundant in the streams of eastern and central United States are *Amiurus platycephalus* (Girard) and

AMIURUS NEBULOSUS (Lasueur)

Common Catfish

The species is also called Common Bullhead, Bull Pout and Horned Pout. It has a wide geographic range, is plentiful in the Great Lakes and abundant in the coastal streams from Maine to Florida. It prefers/waters with muddy bottoms and moves slowly sluggish along the lower levels with barbels widely spread, seeking food. The female spawns in early spring and the old fish guard the eggs and watch over the young fish until they are able to fend for themselves.

Like other species of the genus, *Amiurus nebulosus* has an imperfectly developed maxillary bone which forms the basis of a long fleshy barbel -- the horn which gives it the local name of horned pout. Unless care is used in handling the fish a disagreeable but harmless wound may be inflicted by this horn.

The species attains a length of 18 inches and has been acclimated in California, where it is called the Sacramento cat.

57  
LOTA (Cuvier)

Species of the genus Lota are the only fresh-water fish of the Gadidae, which includes cod, haddock, pollock and other salt-water fish. Of the two known species only one is native to American waters, namely,

LOTA MACULOSA (Lesueur)

Spotted Burbot

*Lota maculosa* is found in lakes and slowly running streams of northern and eastern America and Europe. It never enters salt water. In favorable European localities it sometimes attains 50 to 60 pounds weight; in the United States and Canada it is much smaller. Some of its other popular names are eel-pout, cusk, ling, fresh-water cod and lawyer. Nearly a century ago Sir John Richardson reported that every river and lake from the Great Lakes to the Arctic ocean teemed with the burbot. He also said that Methy Lake in Athabasca, Methy River and Methy Portage, also a lake in Labrador derived their respective names from the Cree name for this fish which abounded in those waters. Its French Canadian name is La Loche.

The flesh of the burbot is not highly prized, though early travelers and trappers found it a welcome addition to their limited provisions. Burbot roe is considered a delicacy; pioneer explorers and Indians made of it, with a little flour added, a palatable bread.

The burbot liver is unusually large and oily. It supplies an oil considered valuable for dressing leather and various uses in the arts.

Its specific name refers to its spots and its general form is so unlike that of any other American fresh-water fish  
it  
that/it is easily identified.

52  
ALOSA (Cuvier)

Shad

Segregated and given generic rank by Cuvier, the genus *Allosa* belongs to the Clupeidae or Herring family. The fish of this genus, however, are larger than the herrings; they have a deeper, more compressed body and no palatal teeth; the cheeks are deeper than long. The typical species in North America is

ALOSA SAPIDISSIMA (Cuvier) (Storer)

Common Shad -- American Shad

Anadromous and one of the most important food fish of the Atlantic coastal waters, the shad was formerly much more abundant than it is today. In early times it ascended the Hudson and Connecticut rivers 150 miles to spawn, but increased population and manufactories have greatly decreased that distance. It is reported as far north as Newfoundland and is abundant southward to South Carolina. In the spawning season the shad eats but little and when it returns to the sea is thin and considered undesirable as food.

Shad roe, like herring roe, sinks to the bottom in fresh water. A female shad averages about 30,000 eggs, though five times that number are occasionally extruded. Fresh shad roe is a spring epicurean delicacy along the Atlantic coast, especially in the southern states. It is also utilized by fish canneries. The shad has been introduced to the Pacific coast, but the resultant fish is less savory in Pacific waters than in its native habitat. It is seldom taken south of San Francisco.

In southern waters on the Atlantic side, the shad averages from three to five pounds; formerly, in the Hudson river, 15 pounds was not unusual. It grows two to three feet in length.

3/

CATOSTOMUS (Cuvier)

Fine-scaled Suckers

Lesueur and other of the older ichthyologists included nearly all of the Catostomidae family in the genus *Catostomus*. It is now almost entirely restricted to the suckers. Many species are included, most of them native to North American fresh waters, though one or two are found in Siberia. The typical species is

CATOSTOMUS COMMUNIS (Lesueur)

Common Sucker

Widely distributed from Labrador to Montana, Kansas and south to Florida, the common or brook sucker inhabits rivers, brooks, lakes and bayous. In common with other species of the genus *Catostomus*, its inferior mouth with thick, fleshy lips, enables it to suck up organic matter from the bottom of the waters. In the breeding season the male fish acquires a rosy or orange lateral band.

The sucker is considered best for food in the fall and winter. A favorite winter sport in colder states is fishing ~~xxxxxx~~ for the sucker through a hole cut in the ice. At that season the fish bites readily.

It varies in weight with the seasons and to some extent, in the locality where it is taken. It attains a length of 12 to 15 inches.

LEPOMIS (Rafinesque)

Sunfish

About eight species are included in the genus *Lepomis*. While their differences are sufficient to warrant specific separation, they are, nevertheless, difficult to identify with absolute accuracy. Their superficial characteristics vary with the season, the locus and the age of the fish. The color of each species, however, is brilliant but evanescent. The most important of the true sunfish is

LEPOMIS PALLIDUS (Mitchill)

Blue Sunfish

Among the most abundant fresh-water fish east of the Rocky mountains, the blue sunfish is distinguished by its rounded figure and long, black, opercular flap. It is especially numerous in the Great Lakes and has been introduced to the Pacific coast states. Like many other fresh-water fish, those of this species, in the breeding season, consort in pairs, clear a space near the shore for a nest and guard the eggs until the young are hatched. The blue sunfish has a number of local names, as pond-fish, bluegill sunfish, coppernose, tobacco-box, sunny and others. It is a popular food-fish and, for its size, is considered by sportsmen as one of the gamiest species.

Twelve to fifteen inches is its average size in the east; where introduced in western states, it is smaller.

53  
CYPRINUS (Linnaeus)

The Carps

Originally cited as including all of the eventognathous fish, the genus *Cyprinus* has gradually been narrowed by later ichthyologists, until it is generally limited to the Carp family, of which the typical species is

CYPRINUS CARPIO (Lacépède)

Common Carp

Since the earliest recorded times the carp is known to have been domesticated in China, is still found there in a wild state; and we have reason to believe that it is native to the Far East. The time of its introduction to Europe and North America is unknown. Aristotle mentioned the Carp in his works on Natural History, more than 300 years B.C., as did Pliny the Elder, in his celebrated *Historia Naturalis*, published about 77 A.D. It seems to have been unknown in England and Germany until several centuries later, but in that quaint work "The Boke of St Albans," the first edition of which was published in 1481, Dame Julyana Berners wrote: "The carp is a deyntous fyssh, but there ben few in Englond, and therefore I write the lesse of him."

The carp is extraordinarily fecund and grows rapidly in fresh water. A female may extrude 400,000 to 500,000 eggs, which hatch in 12 to 16 days. The carp is unusually long-lived; its normal life is estimated at 100 to 200 years. It is tenacious of life under adverse circumstances, and will live for several days if taken from the water and placed in wet moss, thus it is easy to transport for artificial propagation.

Sir John Franklin, in his "Narrative of a Journey to the Shores of the Polar Sea", published in 1824, wrote of carp taken from Winter Lake, at approximately 65° North latitude:

"It may be worthy of notice here, that the fish froze as they were taken out of the nets, in a short time became a solid mass of ice..... If in this completely frozen state they were thawed before the fire, they recovered their animation. This was particularly the case with the carp, and we had occasion to observe it repeatedly, as Dr. Richardson occupied himself in examining the structure of the different species of fish, and was always, in winter, under the necessity of thawing them before he could cut them. We have seen a carp recover so far as to leap about with much vigour, after it had been frozen for thirty-six hours."

Owing to its fertility, its feasible transportation from place to place, its tenacity of life and great natural life, the carp has been acclimated in all parts of the world; its size, weight and color are therefore varied. Thirty inches is a common length; in the United States it may attain a weight of 40 to 50 pounds, but is usually much smaller. In the winter months in cold climates it hibernates without food.

The ever-popular goldfish of aquarium and artificial lake is related to the common carp, though it belongs to a different genus (*Carassius auratus*).

57  
MICROPTERUS (Lacépède)

Black Bass

More than fifty years ago Doctor James A. Henshall, internationally known authority and writer on the subject of fish and practical fish culture, gave a clear, concise analytical study of the Bass. In Volume 26 of the Century Magazine, 1883, he wrote:

"There are but two well-defined species, (of black Bass), the large-mouthed bass and the small-mouthed bass. There has been more confusion and uncertainty attending the scientific classification and nomenclature of the black bass than usually falls to the lot of fishes, some dozen generic appellations and nearly fifty specific titles having been bestowed upon the two species by naturalists since their first scientific descriptions by Count Lacépède in 1802..... Much of the confusion attending the common names of black bass arises from the coloration of the species, which varies greatly, even in the same waters; thus they are known ~~xxxxxx~~ as black, green, yellow and spotted bass. Then they have received names somewhat descriptive of their habitat, as, lake, river, marsh, pond, bayou, moss, grass, and Oswego bass. Other names have been conferred on account of their pugnacity or voracity, as, tiger, bull, sow, and buck bass. In the Southern states they are universally known as 'trout'..... The long list of local names applied to the black bass is owing chiefly to its remarkably wide geographical range; for while it is peculiarly an American fish, the original habitat of one or other of its forms embraces the hydrographic basins of the great lakes, the St. Lawrence, Mississippi, and Rio Grande rivers, and the entire water-shed of the South Atlantic States from Virginia to Florida; or, in other words, portions of Canada and Mexico, and the whole United States east of the Rocky Mountains, except New England and the sea-board of the Middle States. Of late years it has been introduced into these latter States, into the Pacific slope, England and Germany."

To his lucid explanation relative to nomenclature and classification of Bass, Doctor Henshall added a few words which ought to be committed to memory and put into practice by every fisherman: "The humane angler always kills his fish as soon as caught by severing the spinal cord at the neck with a sharp-pointed knife, by breaking the neck, or by a smart blow on the head. Then raising the gill-cover, he bleeds the fish by puncturing a large venous sinus, which shows as a dark space nearly opposite the pectoral fin. Killing and bleeding a fish is not only a merciful act, but it enhances its value for the table, rendering the flesh firmer, sweeter, and of better color."

The specimens of Bass hereinafter depicted serve to illustrate the variations outlined by Doctor Henshall.

57

MICROPTERUS SALMOIDES (Lacépède)

Large-Mouthed Black-Bass

The type exponent of the first of the two major divisions of the Bass family is *Micropterus salmoides*, so named, according to Doctor Henshall, from a drawing and description of a Carolina bass sent to Lacépède under the local name of trout or trout-perch; he therefore ~~xxxxx~~ gave it the specific name of *salmoides*, meaning trout-like or salmon-like.

Some writers and sportsmen report that the species prefers quiet waters and is therefore more abundant in lakes than in streams. During the spawning season the sexes consort in pairs, clear a subcircular spot near the shore for a nest, and guard the eggs until the young are hatched. New York state is one of the localities where it is known as Oswego bass and green bass. In that state a black-bass of 10 pounds weight is reported as not unusual.

As indicated by its common name, the large mouth of this species is its prominent feature, the maxillary in an adult fish extending beyond the eye.

18/5  
MICROPTERUS DOLOMIEU (Lacépède) 1802

Small-Mouthed Black-Bass

Like its congener, the large-mouthed black-bass, this species has a wide range of native waters. It, too, has been extensively distributed throughout the United States. It prefers running streams to quiet waters, but is found in some cold lakes. Its mating habits are the same as those of the large-mouthed black-bass; the sexes select copulative mates in the breeding season, arrange a nest near the shore and remain in pairs until the eggs are hatched.

The size of this fish varies in different waters. Five pounds is about its maximum weight. In New York state the species is generally known as black-bass, without other descriptive nomenclature.

59

ROCCUS (Mitchill)

The genus *Roccus* was established in 1814 by Doctor Silas Latham Mitchill, physician, naturalist and author. Doctor Mitchill segregated a small group of fish from the broadly inclusive *Acanthopterygian* family ~~group~~ of Willughby and Ray ; and classified them in the genus *Roccus* (rock) because of the tendency of the fish to dwell near and on under-water rocks. As recognized today the genus includes two species, both American, the leading one of which is

ROCCUS CHRYSOPS (Rafinesque)

White-Bass

Generally abundant in the Great Lakes region, this species is seldom found in the Mississippi Basin and east of the Alleghenies, except where artificially transported and propagated. It is wholly a fresh-water fish and prefers lakes to streams for its habitat. It is popular as a food fish and sportsmen consider it a good game fish.

It averages 12 to 18 inches in length and one to two pounds or slightly more in weight. Its silvery color is responsible for its popular name of White Bass; also, in some places, White Lake Bass.

6/

POCCUS LINEATUS (Bloch)

Striped Bass or Rockfish

this species

Like its congener, (*Poccus chrysops*)/is a fine game fish and is of considerable economic importance. It is native to the Atlantic coast from the St. Lawrence south to western Florida; and is found in the Gulf of Mexico, though rarely. It is anadromous and enters fresh water streams only at its spawning season. It ascends the rivers for a long distance unless stopped by some unsurmountable obstruction. It has been successfully planted in Pacific coast waters, from northern Oregon south to San Francisco Bay. It may be distinguished from *Poccus chrysops* by the fact that it has two patches of teeth on its tongue instead of one; and its back is not so arched as that of *Poccus chrysops*.

As a food fish, *Poccus lineatus* is considered one of the best. When permitted to grow to complete maturity this fish attains a great size, often six feet long and more than 100 pounds in weight. Specimens caught for market, however, are much smaller, ranging from 4 to 10 pounds.

6/

AMBLOPLITES RUPESTRIS (Rafinesque)

Rock Bass -- Redeye -- Goggle-eye

The genus *Ambloplites* was established in 1820 by Rafinesque. It includes some of the centrarchoid fish, having pterygoid teeth and numerous anal spines.

*Ambloplites rupestris* gained its specific name because of its tendency to lurk about sunken logs or rocks in the fresh waters from which ~~xxx~~ its native habitat. Its popular name of rock bass sometimes engenders confusion by its likeness of designation to that of *Poccus lineatus* or "rockfish", though the two are generically unrelated.

*Ambloplites rupestris* has a wide range east of the Mississippi river and is one of the most abundant panfishes of that region. It prefers clear, cool water and is more abundant in streams than in lakes and ponds. It spawns in the spring in streams with gravelly bottoms, or, if in a lake, on a submerged sandbar, where it constructs a nest and watches over the eggs until the young are hatched. It attains a maximum weight of one and a half pounds and length of 12 inches. Because its eyes are rather prominent and tinged with red it has received the vernacular names of redeye and goggle-eye.

6/

MORONE (Mitchill)

The genus *Morone* closely resembles that of *Roccus*, also established by Doctor Mitchill. It differs from the latter principally in its junction of the dorsal fins, its stronger, ungraduated spines, subequal jaws and absence of teeth at the base of the tongue. Two species are recognized: *Morone interrupta* (Gill) and *Morone americana* (Gmelin). Of these two we may consider as typical

MORONE INTERRUPTA (Gill)

Yellow Bass

Seldom more than 15 inches long and 3 pounds in weight, this beautiful fish is native to the fresh waters of the Mississippi valley, especially south of St. Louis. Some sportsmen consider it superior to the black-bass as a game fish. It is also popular for the table. The broken continuity toward the tail of its black, longitudinal side markings, gives the fish its specific name. Because of its brassy-yellow color in life, it is locally called yellow-bass.

63/  
MORONE AMERICANA (Gmelin)

White Perch

Common on the Atlantic coast from the St Lawrence River to the Carolinas, this fish takes high rank as a game and food fish. It is found in either, fresh, brackish or salt water, and is sometimes land-locked, in which event it is wholly a fresh-water fish. When living in salt or brackish water it frequently ascends the fresh-water streams to spawn. Its popular name of White perch is misleading, as it is not a true perch, though it has some of the characteristics of the Percidae. The "Little White Bass" described by De Kay ((*Labrax pallidus*) is also called White Perch and is considered by some authorities to be identical with this species. Its usual size is not large, 12 to 15 inches in length and 1 to 2 pounds in weight.

Its nominal representative in Pacific coast waters, the Pacific White Perch, (*Phanerodon furcatus*), is viviparous, about 12 inches in length, is abundant from Vancouver Island to San Diego and is of considerable commercial importance.

6/

POMOXYS

POMOXYS (Rafinesque)

In 1818 Rafinesque segregated the fish of the genus which he called Pomoxyx, from the other Centrarchidae. A few of the prominent features of the genus thus established are: The short, greatly compressed body, projecting snout, large mouth, large fins and complete lateral line.

Two species of the genus are recognized, the one of wider distribution being

POMOXYS ANNULARIS (Rafinesque)

Crappie

Because of the great area where this fish is native it has received an almost unlimited number of local names. Its natural range is from Vermont and New York westward through the Great Lakes region and the Mississippi Valley to the Dakotas and southward to Texas. It is frequently confused with its congener, *Pomoxyx sparoides* (Calico-Bass). It abounds in the quiet waters of ponds, lagoons and bayous and other sluggish waters. Its range has been considerably extended through the work of the United States Fish Commission, but as a rule, the results of its artificial distribution are only indifferently successful. A young crappie does not respond readily to the artificial food supplied by the hatcheries, hence the number raised to distribution age is limited.

The crappie attains a length of about a foot, and if taken in water not too muddy is utilized for food.

65

POMOXIS SPAROIDES (Lacépède)

Calico Bass

The range of *Pomoxis sparoides* is wide, like that of its congener, *Pomoxis annularis* (the Crappie) and covers most of the territory east of the Mississippi basin. The calico bass, however, is abundant towards ~~thick~~<sup>the north,</sup> while the Crappie increases in numbers in southern regions. The habits of the two species are the same and they frequent the same kind of waters, namely, quiet ponds, small lakes, bayous and sluggishly running brooks. In external appearance they resemble each other closely. The calico bass has a few more dorsal spines than the crappie and the anterior profile of the two species differs. The fins of the calico bass are not so high as those of the crappie.

The calico bass grows to a length of 12 to 14 inches and a weight of 8 to 16 ounces.

6/

CHAENOBRYTTUS (Gill)

A monotypic genus, whose single species resembles ~~Amblo-~~ plites in form and dentition, but in spines is like Lepomis. The one species of the genus is

CHAENOBRYTTUS GULOSUS (Gill)

Warmouth

A centrarchoid fish, whose specific name refers to its gluttonous habits. It owes its popular name to its large mouth which is disproportionately large for a fish which seldom exceeds ten inches in length. It is also called mud sunfish and Indian fish. It has a wide range in the eastern and central United States. It prefers sluggish waters and shallow ponds and small lakes. It is unimportant as a food or game fish, but is attractive for its odd combination of huge mouth and prominent eyes, the latter feature giving it the name of "goggle-eye" in some localities.

67

PERCA (Linnaeus)

The genus *Perca* belongs to the family *Percidae*, one of the largest and most interesting groups of freshwater fish. They are native to European and American waters. Of the three species which belong to the genus *Perca*, only one is found in America. That one is

PERCA FLAVESCENS (Mitchill)

Yellow Perch -- Ringed Perch

Closely resembling its European congener, *Perca fluviatilis* this fish is one of the larger of the true perches, as well as one of the most popular among sportsmen. It is by preference a lake fish, but is found in both lakes and streams in the northeastern part of the United States. It is one of the best freshwater food fishes and is of some importance commercially. It bears the local names of Ringed Perch and Raccoon Perch from the fancied resemblance of its dark markings to the rings on a raccoon's tail.

In the United States this fish attains a length of 14 inches and a weight of 2 to 4 pounds. Its European ~~congener~~ grows to a much larger size -- from 8 to 10 pounds in weight.

67

### ARCHOPLITES (GILL)

The genus *Archoplites*, established by Gill, is monotypic. Some authorities question its generic individuality and assert that it is sufficiently close to Rafinesque's genus, *Ambloplites*, to warrant its inclusion in that genus, with the common Rock bass or Redeye. However, as it is not plentiful anywhere and is the only representative of its family native to the Pacific coast, it is here given Gill's generic and specific name of

#### ARCHOPLITES INTERRUPTUS (Gill) Sacramento Perch

The vertical, blackish bars, irregular in form and broken in outline, which make the attractive markings on this <sup>fresh-water</sup> fish, account for its specific name of *interruptus*. Native to the Pacific coast, it is found in the Sacramento-San Joaquin basin, Clear Lake and Kern Lake, (all in California) and has been lightly distributed to other waters. It is a popular game fish but is prohibited to commercial fishermen. Sportsmen are permitted to take it only in certain seasons and under the restrictions of the game laws. It sometimes attains a length of one to two feet, but is usually much smaller.

67  
STIZOSTEDION (Rafinesque)

The fish of this genus belong to the family Percidae and are true Perches. They have an elongated body and canine teeth on jaws and palatines. Their scales are small and their lateral line is continuous. The genus includes two species, both large, carnivorous, fresh-water fish of North American waters, valued both as food and game fish. The two species are *Stizostedion vitreum* and *Stizostedion canadense*. The type species is

STIZOSTEDION VITREUM (Mitchill)

Wall-eyed Pike -- Pike-perch

In the United States the Pike-perch has received many local names. Its peculiar brassy coloring gives it the name of Yellow pike-perch in one locality; its large, prominent eyes christen it Wall-eyed pike or Wall-eyed pike-perch, or Glass-eye in another. It is also known as Green pike and jack-salmon.

It is a fresh-water fish and is found in the streams and lakes from Lake Champlain westward through the Great Lakes, in the Mississippi Valley and southward to Georgia and Alabama. It prefers lakes to streams and is most abundant in the Great Lakes, where it attains its maximum size of 3 feet in length and 25 pounds in weight. Its average is about 7 to 10 pounds.

The Wall-eyed Pike spawns in early spring, when the water is very cold. It seeks shoal water for the purpose, with hard or gravelly bottom. A small female will produce about 90,000 eggs and one of maximum size ten times that number.

This valuable food fish has been extensively propagated by the United States Fish Commission.

29

STIZOSTEDION CANADENSE (Smith)

Sauger -- Sand-pike

Less important as a food fish than *Stizostedion vitreum*, this species is smaller than the latter. It is seldom more than 15 to 18 inches long and its maximum weight is about 2 pounds. Its range is from the St. Lawrence westward through the Great Lakes to Montana and southward to Tennessee and Arkansas, but it is more abundant in the St. Lawrence and the Great Lakes than elsewhere. It is readily distinguished from its sister species by the difference in size; also by its greater number of pyloric caeca of uneven length.

The species varies somewhat in different loci; the specimens of the upper Great Lakes have smoother opercles and fewer scales on the head than those of the Lower Great Lakes, while some taken in the upper Missouri basin have a more slender head than the ~~the~~ typical sauger. These variations have led to the acceptance *canadense* by some writers, of two subspecies: *Stizostedion/griseum* of the upper Great Lakes and *Stizostedion canadense boreum* of the upper Missouri basin. The variations, however, are so slight that the establishment of these two subspecies appears to be superfluous.

Other popular names for the sauger are horn-fish and Gray pike-perch.

ESOX (Linnaeus)

The Pikes

The fish of this genus belong to the Esocidae, a monogeneric family, the species of which inhabit fresh waters in Europe, Asia and North America. The popular name refers to the long, slender body and elongated, depressed snout, which combine to produce a fancied resemblance to the infantry weapon of the seventeenth century called a pike.

The one genus, *Esox*, includes seven species, six of which are confined to North America; the seventh, which is cosmopolitan in range and may be considered the type species is

ESOX LUCIUS (Linnaeus)

Common Pike

Known in Europe as the English pike, this is the most important and most widely distributed of pike species. It is native to many of the fresh waters of Europe, Asia and North America but is not found on the Pacific coast of the latter country except in Alaska. It is common in the upper Mississippi Valley and in the Great Lakes. It is vicious and voracious in relation to other fish and will joyously attack a fish of its ~~own~~ size, sometimes of its own kind. It devours large numbers of small fish, frogs, young water-rats and has been known to prey on young ducklings. It is common in Canada, where it is known to the Cree Indians as *Ey-thinni-kannu-shé-u*; and to the Chipewyans of Athabasca as *Ultai-yé*; both words having the same meaning, namely, a pike.

*Esox lucius* is one of the larger species of pike. It grows to a length of 4 feet and a weight of 40 pounds, sometimes more. It spawns abundantly in grassy and weedy shallows.

17  
ESOX AMERICANUS (Gmelin)

Banded Pickerel

Other popular names for this species are Federation Pike, Barred pickerel and banded pickerel. It is the smallest species of the genus *Esox*. It inhabits streams east of the Alleghanies from Massachusetts to Florida, but is only found elsewhere in limited numbers. Its peculiar markings are responsible for one of its local names, "Federation pike", as the dark transverse bars on its sides and the number of rays frequently (not always) number thirteen. Its distinguishing feature is the complete scaling of its cheeks and opercles.

The small size of the species precludes it from high rank as a food fish; it seldom exceeds 12 inches in length.

*Esox vermiculatus* (La Sueur), The Little Pickerel, is also a small species, common east of the Alleghanies, in sluggish streams and small ponds where aquatic vegetation flourishes.

23  
ESOX NOBILIOR (Thompson)

Maskinonge

The largest and finest of the pikes, this species is native to the Great Lakes and some of their tributaries, the upper St. Lawrence River, some of the lakes in the upper Mississippi Valley and various parts of Canada north of the Great Lakes.

Cuvier gave it the specific name of *Esox estor*; Mitchell termed it *Esox masquinongy*; Thompson, apparently with a descriptive name in mind, called it *Esox nobilior*. The latter name is here adopted, as Thompson's nomenclature has priority over Cuvier's and Mitchell. Also, Thompson's knowledge of the species was the result of personal study and exploration, while that of Cuvier and Mitchell was largely the result of research in the findings of others, -- so far as this species was concerned.

A variety of forms of the popular name, maskinonge, are used by different writers, such as muskellunge, maskilonge, masque allongé (simulating French), and others. The name maskinonge is of Algonquin Indian origin and means literally, "great pickerel" or "great fish".

The maskinonge well deserves its specific name of nobilior, as it attains a length of 4 to 6 feet and a weight of 100 pounds and more. The air-bladders and skins of the species are used in isinglass manufacture.

In Chautauqua Lake, New York and in the Ohio basin is found a maskinonge, known as the Chautauqua maskinonge, which has been given specific rank as *Esox ohioensis* (Kirtland). It is considered superior to *Esox nobilior* as a food-fish and has been extensively propagated by the United States Fish Commission. Its flesh is whiter than that of *Esox nobilior* and its color and markings are somewhat different. *Esox immaculatus* (Garrard) is also a maskinonge.

ESOX RETICULATUS (La Sueur)

Common Eastern Pickerel

Also known as Green pike and Jack, this species is common east and south of the Alleghanies. Its range is westward to Arkansas and it is abundant in the Ozarks. It is popular as a food fish and may be taken at any time of year. It is often fished for through the ice in New England and New York. It has been widely distributed by artificial means, which, added to its natural abundance, have caused to be known in practically all the lakes and streams of New England and the north central states.

It attains a length of about two feet and a weight of several pounds.

Its specific name of reticulatus refers to the dark lines and streaks on its sides which, from their junction with one another, give the fish a reticulated appearance.

75  
TYLOSURES (Cocco)

The genus *Tylosures* is one of the divisions of the family Belonidae (Cuvier) and includes several species, popularly called Needlefishes. They are not popular as food fishes, owing to the peculiar green color of their bones, though the flesh is well-flavored and nutritious. The species here selected as typical of the genus is

*TYLOSURUS LONGIROSTRIS* (Mitchill)  
(~~Mitchilli~~)

Garfish

Also called the Silver garfish, Banded garfish and other popular names, this species is common from Maine to Texas. It inhabits lakes and streams of the coastal states and is sometimes confused with its congener, *Tylosurus marinus*, a salt-water, anadromous fish. Its skeleton is almost completely ossified, and its backbone is remarkable for its accurate articulation.

Its slender body attains a length of two to four feet.

16  
LEUCICHTHYS (Dybowski)

The fish of the genus Leucichthys were included in the comprehensive genus *Argyrosomus*. In 1874 Dybowski separated two ~~species~~ Siberian species from *Argyrosomus* and gave them the generic name, *Leucichthys*. The characteristics of these species are so similar to those of American lake herring, ciscoes, and tullibees ~~that~~ that the latter fish are now classed as *Leucichthys* species. They are, however, divided into three sub-groups: *Thrissomimus*, *Cisco*, and *Allosomus*. To the first of these belongs the species

LEUCICHTHYS SISCO HURONIUS (Jordan and Evermann)

Lake Huron Herring

Other popular names for this fish are Blueback herring, and Michigan herring. It is more abundant in Lake Huron and Lake Michigan (especially the former) than in the other Great Lakes. It is occasionally taken in Lake Erie, but retains its specific differences away from its home waters. Though rated as one of the food fish of the Great Lakes region, it is dry and flavorless as compared with the Erie herring.

27  
LEUCICHTHYS ARTEDI (Lesueur)

Erie Herring

Other popular names for this species are: Lake herring, Common lake herring and Grayback. It is more abundant than the other lake herrings, especially in the southern parts of Lake Erie. Because of its abundance, it is commercially important for the markets, though its flesh is inferior to some of the other species of the genus. It ascends to Lake St. Clair and is occasionally taken in Lake Huron, but seldom in Lake Ontario.

artedi

Leucichthys is not one of the larger lake fishes; it attains a length of 12 inches and a maximum weight of two pounds.

## LEUCICHTHYS NIGRIPINNIS (Gill)

## Blackfin of Lake Michigan

The *nigrispinis* or blackfin belongs to the Cisco group of *Leucichthys* and is the largest of any fish of this genus except *Leucichthys eriensis* of the *Thissomimus* division. It is native to the deep waters of Lake Michigan and the small lakes of Wisconsin. Its flesh is of fine quality and in Lake Michigan it is abundant enough to be commercially important. Its distinctive features are its plump body, rather large eyes and mouth and black fins.

79  
THYMALLUS (Cuvier)  
Grayling

The genus *Thymallus* was so named by Cuvier because of the peculiar fragrance of the fish when first taken from the water. Cuvier wrote: "Recent it smells like wild thyme, and when cooked in its perfume is a dainty dish." The European species -- for centuries before Cuvier's time known only as grayling -- was later specifically designated *Thymallus vexillifer* (also called *Thymallus vulgaris* and *Thymallus thymallus*). The name *vexillifer* refers to the beautiful, large, dorsal fin of the fish, which, erect in the water, waves like a brilliant banner. Three North American species are recognized: *Thymallus signifer*, *Thymallus montanus* and *Thymallus tricolor*. All, including the European species, exist in clear, cold water. Under its long-time popular name of grayling, the European species has been extolled as a game fish by English authors on angling from the time of Dame Juliana Berners in the fifteenth century to the present day.

Ichthyologists assert that the various species of *Thymallus* differ only because of separation from each other by the phenomena of glacial movement and glacial changes of northern water-sheds. However, by reason of different waters, climate and other local conditions they have developed individual characteristics which warrant specific differentiation and nomenclature.

The type ~~specimen~~ of the North American species is

· *THYMALLUS SIGNIFER* (Richardson)

Alaska Grayling or Arctic Grayling

The Arctic grayling is considered the progenitor of the genus *Thymallus*. Like its sister species it inhabits only clear, cold waters with sandy or gravelly bottoms. Its range extends from northern lakes and streams to the Arctic ocean. Its magnificent dorsal fin is larger than that of the European grayling (*Thymallus vexillifer*) and its various dialectic names refer to that feature. The Alaskan and Canadian Eskimos call it "Hewlook powak" (wing-like fin); the Indian tribes who inhabit its native regions name it *tehsehi* and *thlu-d-detla*; the French Canadians term it *Poisson bleu*.

Fifteen inches in length and one to two pounds in weight is a fair-sized specimen; however, the species attains much larger size, dependent on locality and the extent to which the waters are fished.

80

THYMALLUS MONTANUS (Milner)

Montana Grayling

Thymallus montanus differs but little in external appearance from its Arctic progenitor, *Thymallus signifer*, but is native only to streams emptying into the Missouri river north of Great Falls, Montana, hence its specific name, *montanus*. It prefers the cold running waters for its permanent habitation, as well as for spawning; lake waters seem unsuited to its life-needs. Its spawning season is in April and May.

Artificial propagation of the Montana grayling has been conducted with considerable success for more than thirty years, but it thrives best in its native waters. Sportsmen consider it equal in gameness to the gamiest trout.

*Thymallus montanus* averages 12 inches in length and about one pound in weight.

57

THYMALLUS TRICOLOR (Cope)

Michigan Grayling

Until after the middle of the nineteenth century, fish of the genus *Thymallus* were believed to exist on the North American continent only in Arctic regions. About seventy-five years ago, however, hunters and lumbermen reported a white-meated, gamy fish of superior food quality, in northern Michigan waters. It was known only by local names until a specimen was sent to Professor Edward D. Cope of the Philadelphia Academy of Natural Sciences. He described it in 1865 and named it *Thymallus tricolor*, the specific designation referring to the great beauty of its dorsal fin. The species is seldom, if ever, found outside of Michigan waters where it formerly abounded. Today, owing to the ravages of lumbermen, manufacturers and sportsmen, it is rare except in the least accessible waters.

## TRACHINOTUS (Lacepède)

## The Pompanos

Some of the most commercially important fish belong to the genus *Trachinotus*; also some of the most delicious food fish.

The species are numerous; many of them inhabit tropical or semi-tropical waters. A species common to our Atlantic and Gulf coast is

## TRACHINOTUS CAROLINUS (Linnaeus)

## Common Pompano

More abundant along the South Atlantic and Gulf coasts than elsewhere, this beautiful fish, in favorably warm seasons, ranges as far north as the New Jersey coast and on rare occasions to Cape Cod. Its favorite habitat, however, is the west coast of Florida and the Indian river. It runs in schools, is most abundant about the inlets, feeds principally on small mollusks and small crustaceans, and spawns in April and May. Epicures unanimously pronounce it unsurpassed as a food fish.

The common pompano attains a length of about 18 inches and a weight of 7 to 8 pounds, though 2 to 4 pounds is more usual.

*Trachinotus carolinus* does not occur on the Pacific coast. The fish known there as Pompano is highly esteemed for food, but belongs to a different species and genus than the Pompanos of Atlantic waters. It is *Stromateus simillimus* and is about 12 inches long.